2007

FLOODPLAIN MANAGEMENT IN RHODE ISLAND

Quick Guide

Rhode Island National Flood Insurance Program

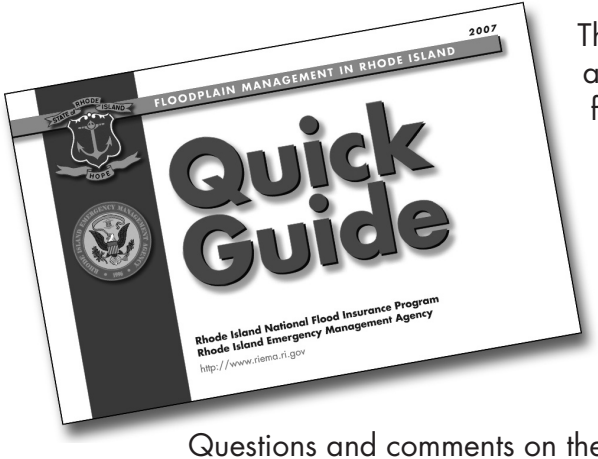
Rhode Island Emergency Management Agency: http://www.riema.ri.gov

Rhode Island Flood Mitigation Association: http://ri.floods.org

Table of Contents

Table of Contents (continued)

About This Guide



This **Quick Guide** will help you understand more about why and how communities in the State of Rhode Island manage floodplains to protect people and property.

Flood-prone communities adopt ordinances that detail the rules and requirements for floodplain development. In case of conflict, that ordinance and not this publication, must be followed. If you have questions, be sure to talk with your local planning, permit, engineering, or floodplain management office.

Questions and comments on the **Quick Guide** can be directed to the Rhode Island Emergency Management Agency (RIEMA), State Floodplain Manager in the State's National Flood Insurance Program office at http://www.riema.ri.gov.

Prepared by:

RCQUINN CONSULTING, INC.

www.rcquinnconsulting.com

In association with:

Rhode Island Flood Mitigation Association
http://ri.floods.org

Introduction

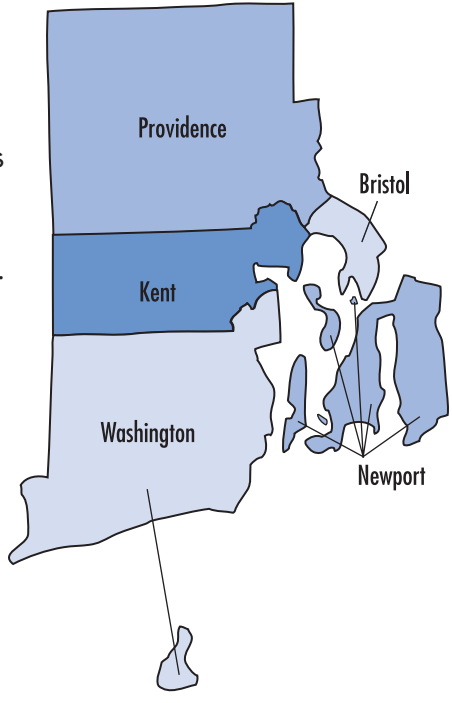
The Rhode Island NFIP office, is pleased to provide this **Quick Guide** to help our citizens understand what floodplain management is and why floodplain development is regulated.

Rhode Island's counties, cities, and towns regulate the floodplain to:

- **Protect** people and property
- **Ensure** that Federal flood insurance and disaster assistance are available
- **Save** tax dollars
- **Reduce** liability and law suits
- **Reduce** future flood losses

Rhode Island Floodplain Facts

- Floods have been, and continue to be, a destructive natural hazard in terms of economic loss to the citizens of Rhode Island.
- Rhode Island communities experience coastal flooding, flooding of rivers and streams, and urban stormwater problems.
- All 39 communities participate in the National Flood Insurance Program.
- Approximately 14% of the State's 1,100 square miles of land area is mapped as flood-prone.
- Nearly 14,000 buildings and structures are located in floodplains mapped by the NFIP.
- Since 1978, flood insurance policy holders in Rhode Island have received over $28 million in claim payments – even though that represents many payments, fewer than 3% of the State's flood-prone property owners have flood insurance.



Why Do We Regulate the Floodplain?

- **To protect people and property.** Floodplain management is about building smart. It makes good sense. If we know part of our land will flood from time to time, we should make reasonable decisions to help protect our families, homes, and businesses.
- **To make sure that Federal flood insurance and disaster assistance are available.** If your home or business is in the floodplain, and Federal flood insurance is not available, then you cannot get certain types of Federal financial assistance. Home mortgages will be hard to find and you will not be able to get some types of state and Federal loans and grants.
- **To save tax dollars. Every flood disaster affects your community's budget.** If we build smarter, we will have fewer problems the next time the water rises. Remember, Federal disaster assistance is not available for all floods. Even when the President declares a disaster, your community still has to pay a portion of the costs of evacuation, temporary housing, repair, and clean-up.
- **To avoid liability and law suits.** If we know an area is mapped as a floodplain and likely to flood, if we know people could be in danger, and if we know that buildings could be damaged, it makes sense to take reasonable protective steps when we develop and build.
- **To reduce future flood losses in Rhode Island.** Development that complies with the minimum floodplain management requirements is better protected against major flood-related damage.

What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to protect lives and property and to reduce the financial burden of providing disaster assistance. The NFIP is administered by the Federal Emergency Management Agency (FEMA). Nationwide, over 20,000 communities participate in the NFIP—including all Rhode Island counties, cities, and towns.

The NFIP is based on a mutual agreement between the Federal Government and communities. Communities that participate agree to regulate floodplain development according to certain criteria and standards. The partnership involves:

- **Flood hazard maps.** FEMA prepares maps that are used by communities, insurance agents, and others.
- **Flood insurance.** Property owners in participating communities are eligible to purchase federal flood insurance for buildings and contents.
- **Regulations.** Communities must agree to adopt and enforce floodplain management regulations so that development, including buildings, is undertaken in ways that reduce exposure to flooding.

To learn more about the NFIP, including your potential flood risk and the approximate cost of a flood insurance policy, go to FEMA's FloodSmart website http://www.floodsmart.gov.

Community Responsibilities

To participate in the National Flood Insurance Program, your community agrees to:

- **Adopt and enforce** a flood damage prevention ordinance.
- **Require** permits for all types of development in the floodplain (see page 21).
- **Assure** that building sites are reasonably safe from flooding.
- **Estimate** flood elevations where not determined by FEMA.
- **Require** new or substantially improved homes and manufactured homes to be elevated above the Base Flood Elevation (BFE).
- **Require** non-residential buildings to be elevated or floodproofed.
- **Determine** if damaged buildings are *substantially* damaged.
- **Conduct** field inspections and cite violations.
- **Require** Elevation Certificates to document compliance (see pages 30, 31, and 32).
- **Carefully consider** requests for variances.
- **Resolve** non-compliance and violations.
- **Advise** FEMA when updates to flood maps are needed.

National Flood Insurance Program

Flood Insurance: Property Owner's Best Protection

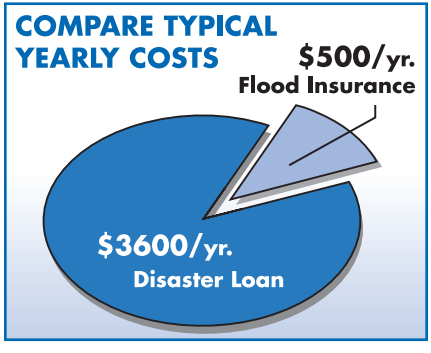
Who needs flood insurance? Federal flood insurance is required for all buildings in Special Flood Hazard Areas shown on FEMA's maps if they are financed by federally-backed loans or mortgages. All homeowners, business owners and renters in communities that participate in the NFIP may purchase federal flood insurance on any building, even if outside of the mapped flood zone. If your home is in the floodplain, you are five times more likely to be damaged by flood than by a major fire.

Not in a mapped floodplain? Unfortunately, often it is after a flood that many people discover that their home or business property insurance does NOT cover flood damage. Approximately 25% of all flood damage occurs in low risk zones, commonly described as being "outside the mapped flood zone."

Protected by a levee or dam? Even if you live in an area protected by levees or other flood control structures, there is a residual risk that those structures will be overtopped or fail. If your community's levee provides "100-year" flood protection, there is still a chance that a bigger flood will cause flooding.

What about disaster grants and loans? Federal disaster grants do not cover most losses and repayment of a disaster loan can cost many times more than the price of a flood insurance policy.

Want to know more? Learn more at http://www.floodsmart.gov. To purchase a policy, call your insurance agent. To get the name of an agent in your community, call the NFIP's toll free number (888) 356-6329.



The NFIP's Community Rating System (CRS)

The NFIP's CRS gives "extra credit" to communities in the form of reduced flood insurance premiums. Communities must apply to the CRS and commit to implement and certify activities that contribute to reduced flood risk. Examples of actions your community can take to reduce the cost of your insurance premiums include:

- Preserve open space in the floodplain
- Enforce higher standards for safer development
- Undertake engineering studies and prepare flood maps
- Obtain grants to buyout or elevate houses or to floodproof businesses
- Maintain drainage systems
- Monitor flood conditions and issue warnings
- Inform people about flood hazards, flood insurance, and how to reduce flood damage

Community officials can request assistance from CRS specialists to help with the application process and prerequisites. Check the online CRS Resources Center (see page 62).

As of 2007, four Rhode Island communities are in the CRS: the towns of Middletown, Narragansett, and North Kingstown, and the City of Pawtucket. Property owners in the Special Flood Hazard Areas in these communities enjoy a 5% to 10% discount on annual flood insurance premiums (5% in unmapped areas).

Looking for FEMA Flood Map Information?

Enter the FEMA Flood Map Store at **http://msc.fema.gov**. Digital scans of flood maps can be downloaded or hardcopy maps can be ordered. Reach the Map Store by calling (800) 358-9616.

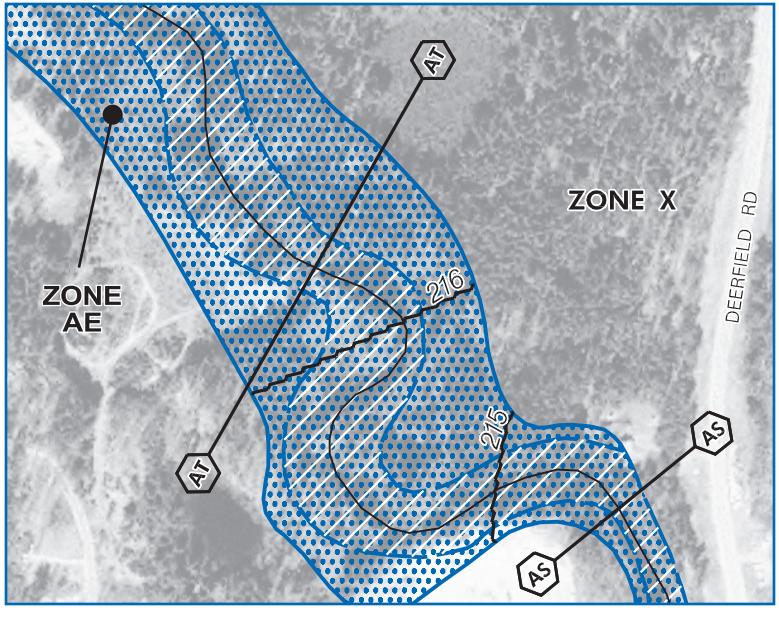
- FEMA prepares Flood Insurance Studies and Flood Insurance Rate Maps (FIRMs) for communities in Rhode Island.
- Most FIRMs show Special Flood Hazard Areas (SFHAs, also called the "100-year floodplain") and floodways. Some FIRMs may show floodplains delineated using approximation analyses (see page 16).
- Not all waterways have designated floodplains – but all waterways will flood, even though a floodplain study may not have been prepared.
- In coastal communities, FIRMs show Special Flood Hazard Areas, including area subject to wave action (see page 18).

Need a fast answer? Visit your community's planning, engineering, or permit office where flood maps are available for viewing by the public.

Flood Map Modernization

RIEMA, FEMA, the U.S. Army Corps of Engineers, and Rhode Island communities are cooperating to modernize the flood maps.

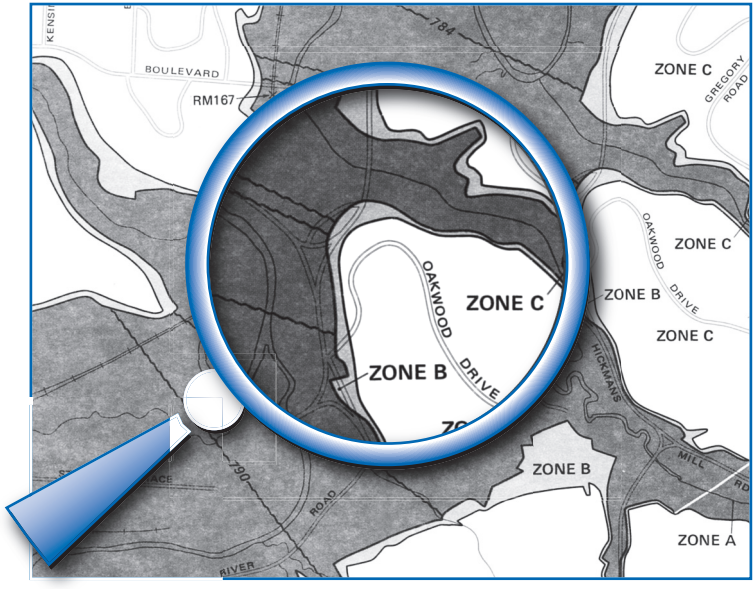
New and revised flood maps are designed to view on a computer, to use in a Geographic Information System (GIS), or to print as paper maps. Flood maps are composites of a photographic base map, topographic data, and flood layers. Flood layers can be used with parcel information or other data to more easily determine if a specific building or site is in a Special Flood Hazard Area or Floodway.



This map uses aerial photography (topographic layer not shown)

To learn more about FEMA maps and map revisions, go to http://www.fema.gov and search on "map modernization".

FIRMette: FEMA Flood Maps Online

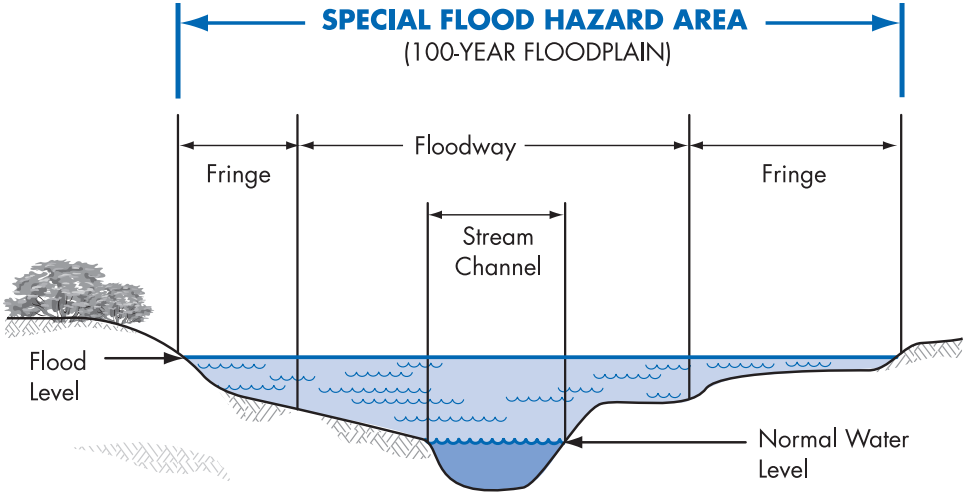


You can order paper maps or digital maps on CD-ROM.

You can find and print a FIRM by using online tools at **http://msc.fema.gov**

- Use "Product Search by Address" on the right OR click on "Product Catalog" at the top of the page, select "FEMA Issued Flood Maps", select the state, county and community, then click on "Find FEMA Issued Flood Maps"
- Click the "View" button to display the map panel.
- Use the pan and zoom tools to find the specific area of interest – a miniature map on the left side of the screen shows a red box around the area you are viewing.
- Click the "Make a FIRMette" button and drag the pink translucent box over the area you wish to print.
- Select paper size and Adobe Acrobat (pdf) or Image File (tif).
- Your FIRMette will be displayed and you can print or save the file to your hard drive.

Understanding the Riverine Floodplain



For floodplains with Base Flood Elevations, check the Flood Insurance Study to find the Flood Profile which shows water surface elevations for different frequency floods (see page 15).

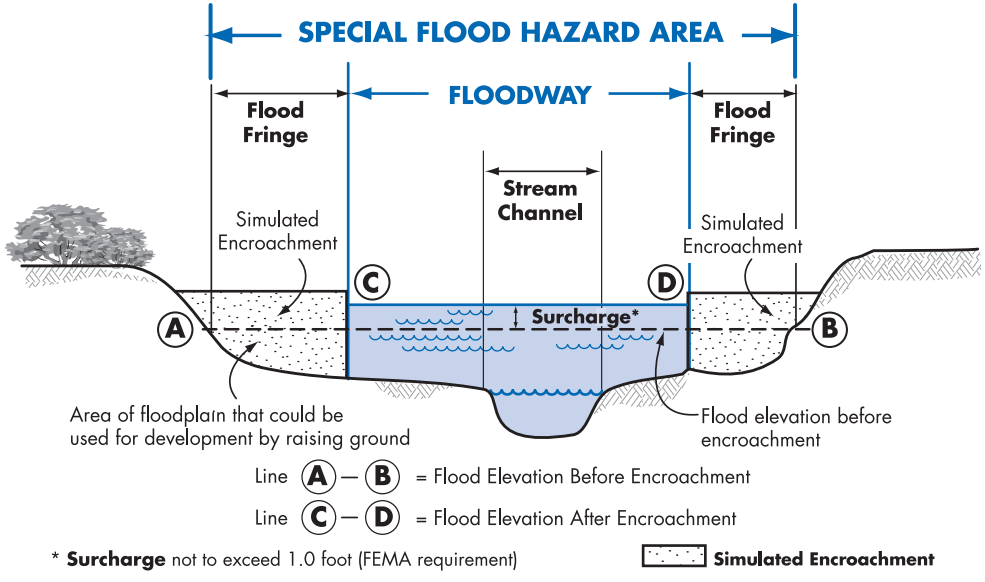
Terms and Definitions

The **Special Flood Hazard Area (SFHA)** is that portion of the floodplain subject to inundation by the base flood (100-year) and/or flood-related erosion hazards. SHFAs are shown on new format FIRMs as Zones A, AE, AH, AO, AR, and A99. Other format FIRMs may have numbered A Zones (A1-A30).

See page 13 to learn about the floodway, the area of the floodplain where floodwaters usually flow faster and deeper.

See page 7 to learn about flood insurance requirements in SFHAs.

Understanding the FEMA Floodway



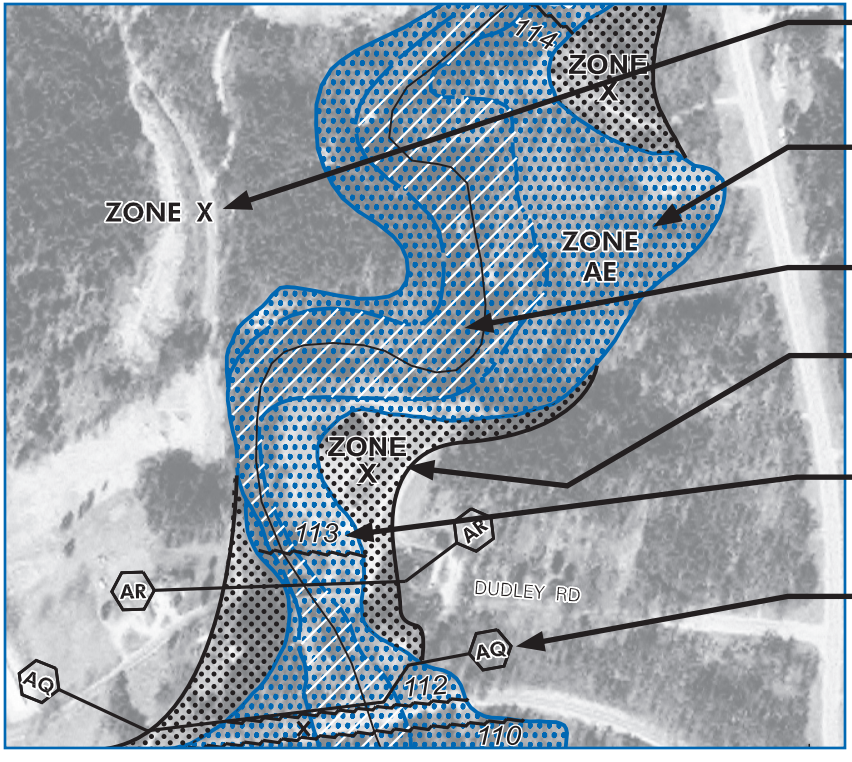
Terms and Definitions

The **Floodway** is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to pass the base flood discharge without increasing flood depths.

Computer models of the floodplain are used to simulate "encroachment" or fill in the flood fringe in order to predict where and how much the base flood elevation would increase if the floodplain is allowed to be filled.

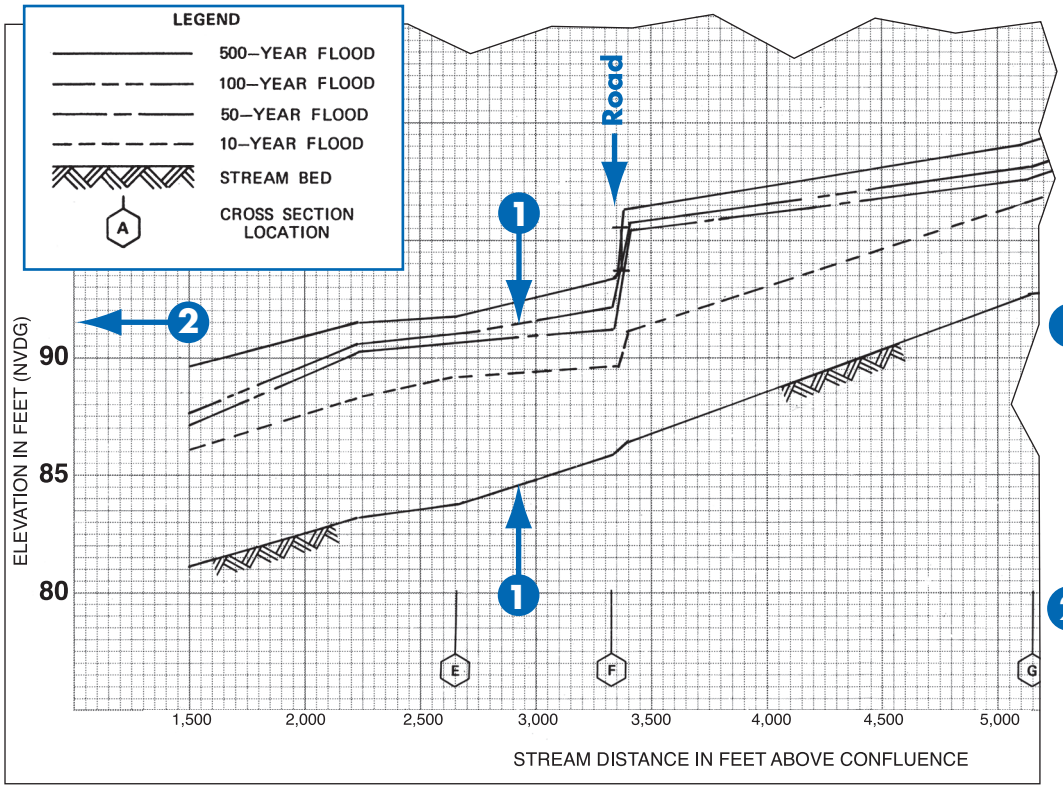
For any proposed floodway development, before a state or local floodplain permit can be issued, the applicant must provide evidence that "no rise" will occur (see page 34).
You will need an experienced registered professional engineer to make sure your proposed project will not increase flooding on other properties.

FEMA Flood Insurance Rate Map (Riverine)



1. **Unshaded Zone X** is the area of minimal flood risk outside the 500-year floodplain (formerly called Zone C).
2. **Zone AE** is the 100-year (1% annual chance) floodplain with BFEs (formerly called Zone A1- A30).
3. The **Floodway** is the cross-hatched area.
4. **Shaded Zone X** is subject to flooding by the 500-year flood (0.2% annual chance), formerly called Zone B.
5. **Base Flood Elevation (BFE)** is the water surface elevation of the base flood at specific locations.
6. **Cross Section** location, where ground surveys determine the shape of the land and how constrictions such as bridges and culverts affect the flow of floodwater (see page 15).

Use the Riverine Flood Profile to Determine BFEs



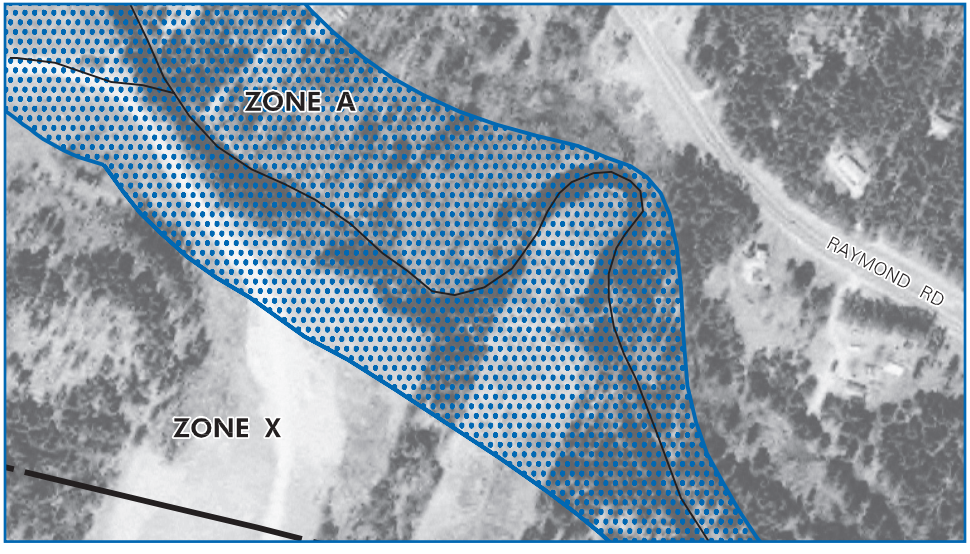
Flood profiles from Flood Insurance Study reports can be used to determine the BFE at a specific site. Profiles also show estimated water surface elevations for floods other than the 1% annual chance flood (100-year).

1. On the effective flood map, locate your site by measuring the distance, along the center-line of the stream channel, from a known point such as a road or cross section, for example, E or F.
2. Scale that distance on the Flood Profile and read up to the profile of interest, then across to determine the elevation.

Approximate Flood Zones and Unnumbered A Zones

Topographic maps can be used to estimate the Base Flood Elevation if the FIRM shows approximate or unnumbered A Zones.

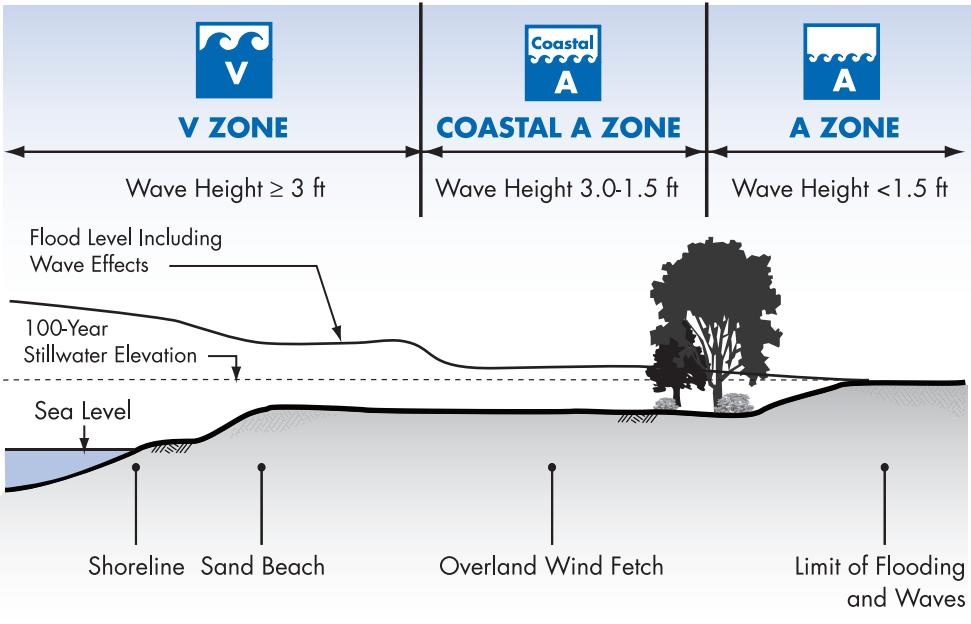
Note: Even if the estimated BFE indicates flooding might be only a foot or two deep, it is recommended that the lowest floor be at least 2 feet above the highest adjacent grade. Not only does this improve flood protection, but lower flood insurance premiums may apply.



If you need help determining the BFE, check with your community's planning, engineering, or permit office.

The FEMA publication *Managing Floodplain Development in Approximate Zone A Areas* (FEMA 265) is useful for engineers and local officials.

Understanding the Coastal Floodplain



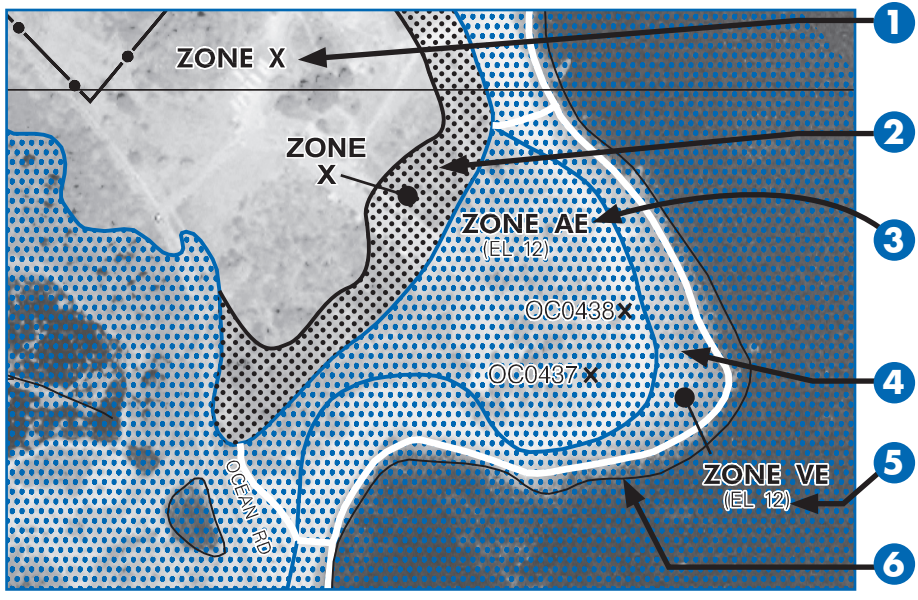
Coastal graphics from *Coastal Construction Manual* (FEMA 55-CD).

Terms and Definitions

The **Coastal High Hazard Area (V Zone)** is the area of special flood hazard that extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action. The area is designated on the FIRM as Zone VE (or Zones V1– V30).

The term **Coastal A Zone** means the portion of the SFHA landward of the V Zone or landward of a shoreline that does not have a mapped V Zone. The principle sources of flooding are associated with astronomical tides, storm surges, seiches or tsunamis. Coastal A Zones may be subject to wave effects, velocity flows, erosion, scour, or combinations of these forces and may be treated as V Zones.

FEMA Flood Insurance Rate Map (Coastal)



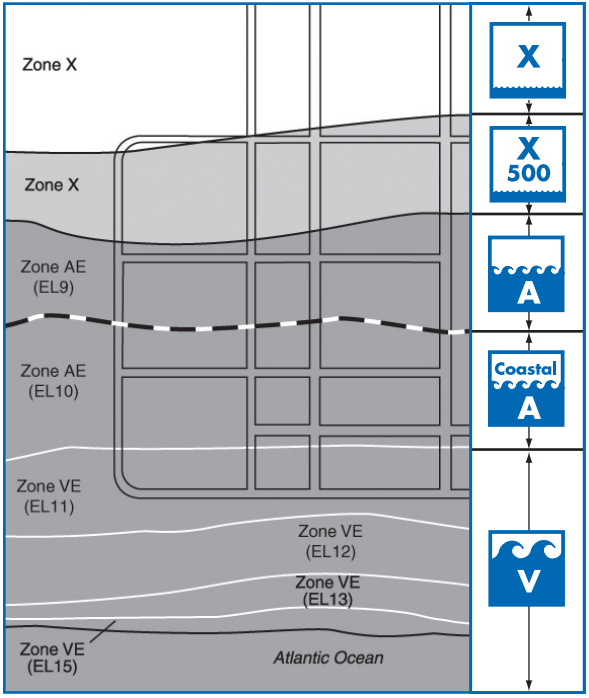
1. **Unshaded Zone X** is the area of minimal flood risk outside the 500-year floodplain (formerly called Zone C).
2. **Shaded Zone X** is subject to flooding by the 500-year flood (0.2% annual chance), formerly called Zone B.
3. **Zone A** and **Zone AE** are subject to flooding by the base or 100-year flood (1% annual chance), and waves less than 3 feet (formerly called Zones A1-A30).
4. **Zone V** and **Zone VE** are where waves are expected to be 3 feet or more.
5. **Base Flood Elevation (BFE)** is the estimated water surface elevation (in feet above datum).
6. **Shoreline**

UNDEVELOPED COASTAL BARRIERS

CRBA OPA

In undeveloped Coastal Barrier Resource Areas (CBRA) and Otherwise Protected Areas (OPA), NFIP insurance is not available for new or substantially improved structures built after November 16, 1990.

The Coastal A Zone



For illustrative purposes only. Flood Insurance Rate Maps do not show the Coastal A Zone Boundary depicted in this example (heavy dashed line).

- Post-flood evaluations and laboratory tests confirm that breaking waves as small as 1.5 feet high cause damage to walls and foundations.
- The CAZ is not shown on FIRMs, but stillwater depths between 2 and 4 feet can support CAZ waves.
- V Zone construction methods are recommended in CAZs, including pile, post and column foundations and breakaway walls around enclosures.
- Where possible, exceed minimum V Zone construction requirements (for example, elevate above BFE)

Terms and Definitions

The **Coastal A Zone** (CAZ) is the area landward of a V Zone, or landward of an open coast without a mapped V Zone, where the principal source of flooding will be astronomical tides, storm surges, seiches or tsunamis, not riverine flooding. During base flood conditions, the potential for breaking wave heights between 1.5 feet and 3.0 feet will exist.

Flood Map Revisions Issued by FEMA

1. **Letter of Map Amendment (LOMA)** is an official amendment to an effective FIRM that may be issued when a property owner provides additional technical information from a surveyor, such as ground elevation relative to the BFE, SFHA, and the building. Lenders may waive the flood insurance requirement if the LOMA documents indicate that a building is on ground above the mapped floodplain.
2. **Letter of Map Revision (LOMR)** is an official revision to an effective FIRM that may be issued to change flood insurance risk zones, floodplain and floodway boundary delineations, BFEs, and/or other map features. Lenders may waive the insurance requirement if the approved map revision shows buildings to be outside of the SFHA.
3. **Letter of Map Revision Based on Fill (LOMR-F)** is an official revision to an effective FIRM that is issued to document FEMA's determination that a structure or parcel of land has been elevated by fill above the BFE, and therefore is no longer in the SFHA. Lenders may waive the insurance requirement if the LOMR-F shows that a building on fill is above the BFE.
4. **Physical Map Revision (LOMR PMR)** may be issued for major floodplain changes that require engineering analyses, such as bridges, culverts, channel changes, flood control measures, and large fills that change the BFE or floodway. Physical map revisions are also issued when a new study updates or improves the FIRM.
5. **Electronic Letter of Map Amendment (eLOMA)** is a web-based application for licensed land surveyors and professional engineers to submit simple LOMAs to FEMA.

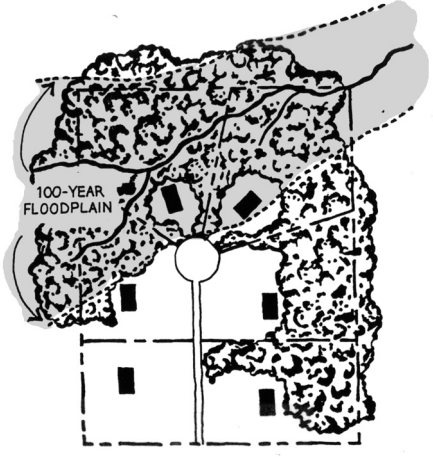
Check online at http://www.fema.gov/plan/prevent/fhm/index.shtm for more information about map revisions for different user groups, including homeowners, surveyors, engineers, and insurance professionals.

Activities Requiring Local Floodplain Permits

- Construction of new buildings
- Additions to existing buildings
- Substantial improvements of existing buildings
- Renovation of existing building interiors
- Repair of substantially damaged buildings
- Placement of manufactured (mobile) homes
- Subdivision of land
- Construction or placement of temporary buildings and accessory structures
- Construction of agricultural buildings
- Construction of roads, bridges, and culverts
- Placement of fill, grading, excavation, mining, and dredging
- Alteration of stream channels

You need local floodplain permits for **ALL** of these activities.

Safe Uses of the Floodplain

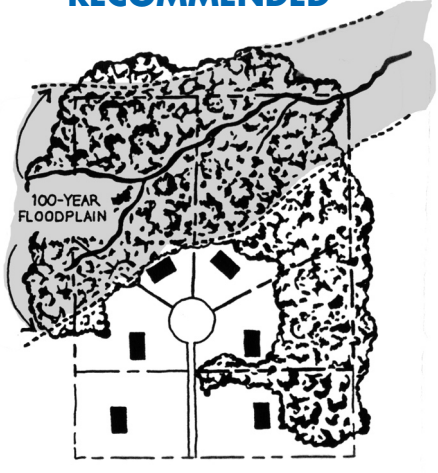


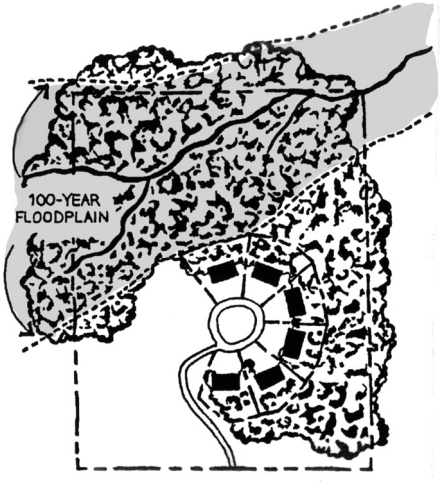
All land subdivided into lots, some homesites and lots partially or entirely in the floodplain.

NOT RECOMMENDED

All land subdivided into lots, some lots partially in the floodplain, setbacks modified to keep homesites on high ground.

RECOMMENDED



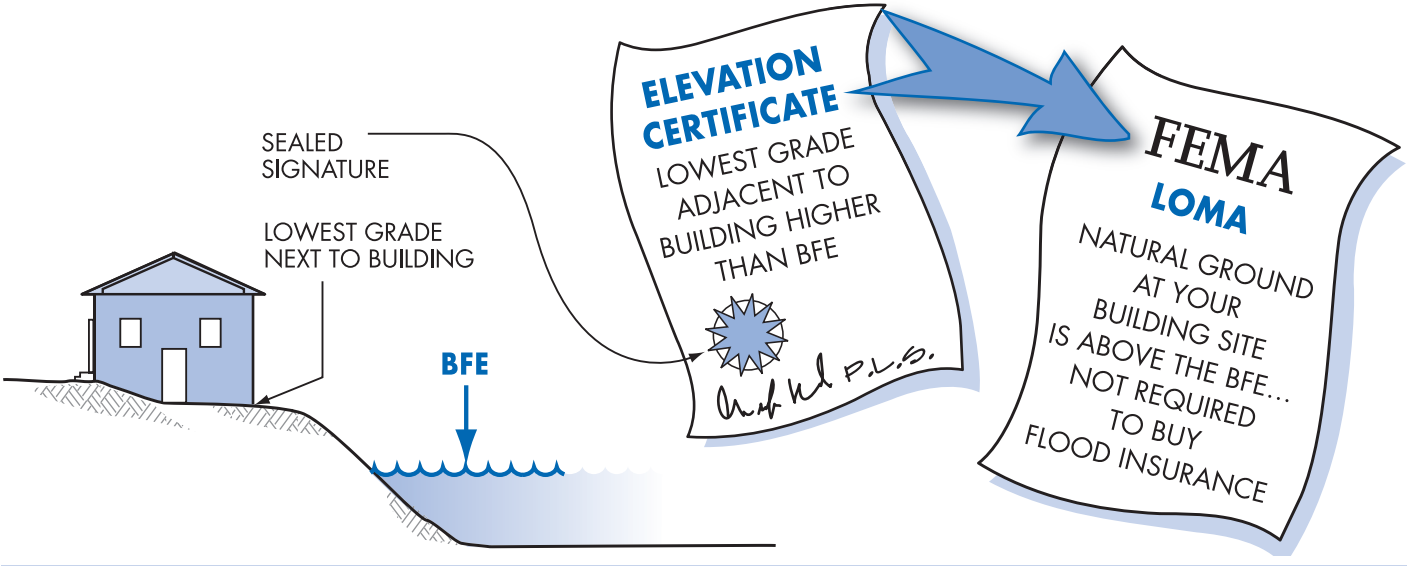


Floodplain land put into public/ common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

RECOMMENDED

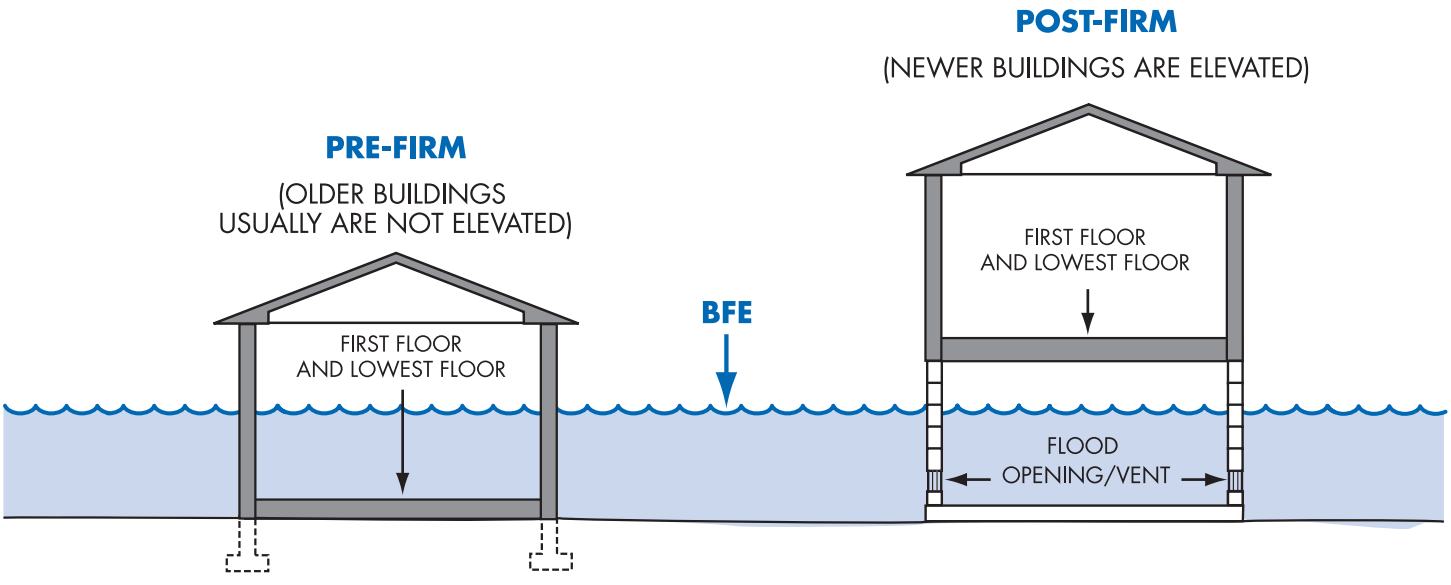
Let the floodplain do its job – if possible, keep it as natural open space. Other compatible uses: recreational areas, playgrounds, reforestation, parking, gardens, pasture, accessory structures, created wetlands.

Is Your Building Site Higher than the BFE?



If your land is shown on the map as "in" the floodplain, but your building site is higher than the Base Flood Elevation (BFE)... get a surveyor or engineer to complete a FEMA Elevation Certificate (EC). Submit a request for a Letter of Map Amendment to FEMA along with the EC to verify that your structure is above the BFE (see page 20). If FEMA approves your request, it will remove the mandatory Federal requirement to purchase flood insurance. Keep the certificate with your deed, it will help future buyers.

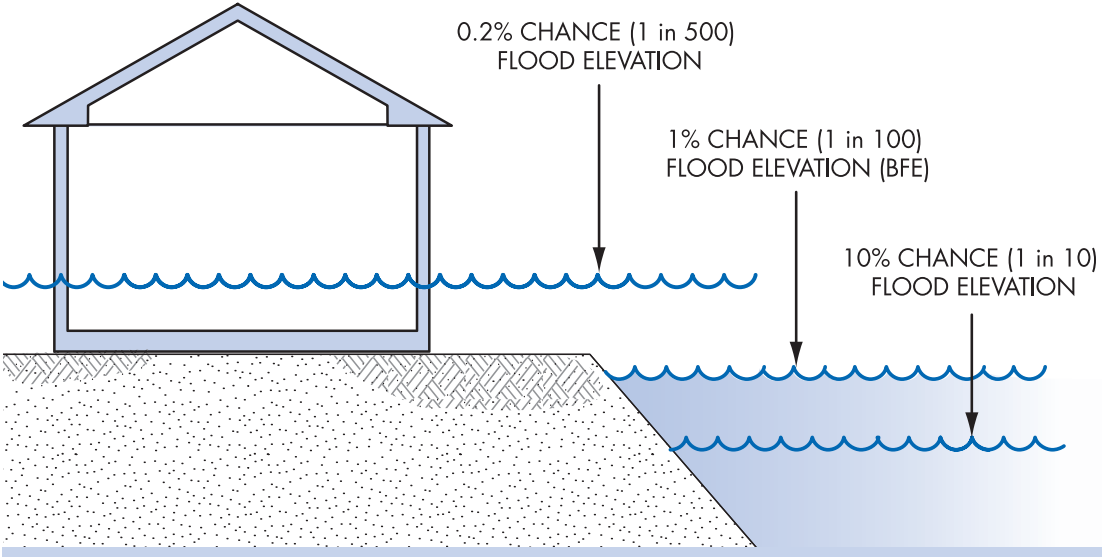
What is Meant by Pre-FIRM and Post-FIRM Structures?



A building is **Pre-FIRM** if it was built **before** the date of your community's first FIRM. If built **after** that date, a building is **Post-FIRM**.

Improvements or repairs to Pre-FIRM buildings may require permits (see pages 49 through 54).

Nature Doesn't Read Flood Maps

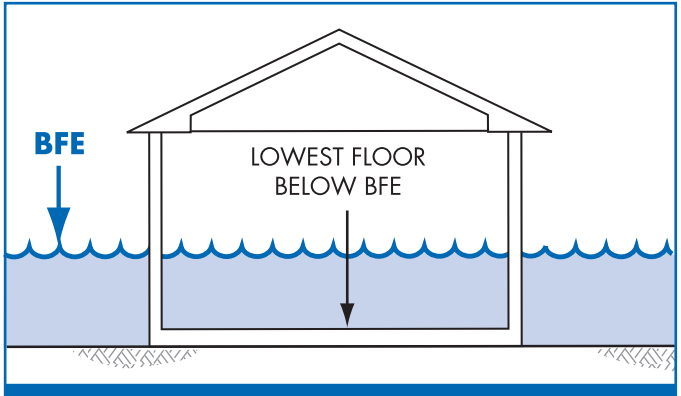


Important Information

Many people do not understand just how risky the floodplain can be. There is a 26% chance that a non-elevated home in the floodplain will be damaged during a 30-year mortgage period. The chance that a major fire will occur during the same period is less than 5%!

CAUTION! Nature doesn't read the flood map! Major storms and flash floods can cause flooding that rises higher than the Base Flood Elevation (BFE). Consider safety – protect your home or business by building higher. See page 29 to see how this will save you money on flood insurance.

Think Carefully Before You Seek A Floodplain Variance



POST-FIRM BUILDING, NOT ELEVATED

INSURANCE $5,000+ PER YEAR

Very specific conditions related to the property (not the owner) must be satisfied to justify a variance:

- Good and sufficient cause
- Unique site conditions
- Non-economic hardship
- If in the floodway, no increase in flood level

A variance that allows construction below the BFE does not waive your lender's flood insurance requirement. Flood insurance will be very expensive – perhaps more than $5,000 per year (see page 29)!

Think carefully before seeking a variance to build below the Base Flood Elevation.
Not only will your property be more likely to suffer damage, but insurance will be very costly.

If your community has a pattern of issuing variances, sanctions could be imposed – costing you even more!

Some Key Floodplain Permit Review Steps

The Permit Reviewer has to Check Many Things. Some of the Key Questions are:

- Is the site near a watercourse?
- Is the site in the mapped floodplain or floodway?
- Have other State and Federal permits been obtained?
- Is the site reasonably safe from flooding?
- Does the site plan show topography, Base Flood Elevation, and building location?
- Is substantial improvement of an older building proposed?
- Is an addition proposed?
- Will new buildings and utilities be elevated properly?
- Will manufactured homes be properly elevated and anchored?
- Do the plans show an appropriate and safe foundation?
- Will the owner/builder have to submit an as-built Elevation Certificate?

Carefully Complete the Permit Application

Owner's Name:
DAVID & SALLY JONES
Site Address, Tax #, Parcel #:
781 REED STREET, 400-33A-002

A. Description of Work

1. Proposed Development Description:

- ☒ New Construction
- ☐ Alteration or Repair
- ☒ Filling
- ☐ Grading
- ☐ Dredging
- ☐ Manufactured/Modular
- ☐ Logging
- ☐ Other

2. Size and Location of Development

SINGLE FAMILY (2,000 CY FILL);
FLOOD FRINGE OF DRY RIVER

3. Type of Construction

- ☒ New Residential
- ☐ New Non-Residential
- ☐ Addition
- ☐ Improvement
- ☐ Renovation
- ☒ Accessory structure
- ☐ Temporary

Community, Map, and Elevation Data:

1. Community No: 445393
2. Panel No: 44001C0003G
3. Zone AE
4. Base Flood Elevation 59.2
5. Required Lowest Floor Elevation (including basement) 60.2
6. If floodproofed, required floodproofing elevation N/A
7. Elevation to which all attendant utilities, including all heating, duct work, and electrical equipment will be installed or floodproofed: 60.2

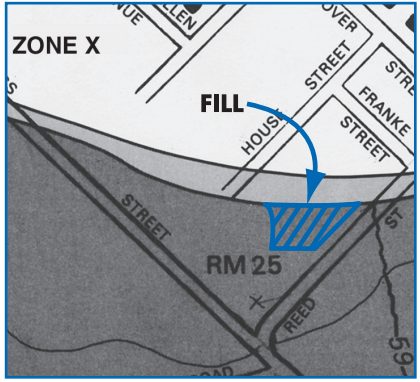
Applicant's Signature: David M. Jones

Part of a sample Floodplain Permit Application
(may vary by community)

Good information will lead to better construction and less exposure to future flood damage.

Important Information

You must get all permits **before** you do work in a floodplain.



Freeboard: Build Higher, Reduce Damage, Save on Insurance

RIEMA recommends that the lowest floor of all new buildings and substantially improved buildings be elevated at least two feet above the BFE. Remember, upstream development as well as uncertainty may result in higher future flood levels. Building higher protects your home and belongings, reduces damage, and lowers the cost of NFIP flood insurance.

The approximate annual costs for NFIP flood insurance on a post-FIRM home in an AE Zone with $250,000 coverage on the structure and $100,000 coverage on contents, are:

+3 ft and higher.....$500
+2 ft to +3 ft.....$525
+1 ft to +2 ft.....$700
BFE to +1 ft.....$1,125
BFE to –1 ft.....$4,950
–1 ft and lower .....Expensive! (submit to FEMA for rates)

Nearly one-third of all NFIP claims are paid on buildings outside of the SFHA (in shaded Zone X and unshaded Zone X areas). In these areas, less expensive "Preferred Risk" policies are available.

Important Information

NOTE: Flood insurance rates and various fees change from time to time. Rather than specific costs for insurance, these figures give a feel for how much difference just a foot or two can make.

Remember!
When building a new home, be sure the builder checks the floor elevation as part of the foundation inspection. An error of just 6 to 12 inches could more than double what you have to pay for NFIP flood insurance.

The community may be able to grant a variance, but the owner will probably still be required to buy insurance. Imagine trying to sell a house if the bank requires insurance that costs about $5,000 a year!

What is the Elevation Certificate and How is it Used?

- The Elevation Certificate (EC) is a FEMA form. Go to http://www.fema.gov/ and search for "Elevation Certificate."
- The EC must be completed and sealed by a licensed surveyor or registered engineer.
- A community official may complete the EC for sites in approximate flood zones and AO Zones.
- It can be used to show that the grades of building sites are above the Base Flood Elevation (see page 23).
- It is used to verify that buildings are elevated properly (see page 32).
- Insurance agents use the EC to write and rate flood insurance policies.

By itself, the EC cannot be used to waive the requirement to obtain flood insurance. See page 20 to learn about FEMA's Letter of Map Amendment.

Completing the Elevation Certificate

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-g below according to the building diagram specified in Item A7.
Benchmark Utilized BM55 Vertical Datum NAVD 1988
Conversion/Comments

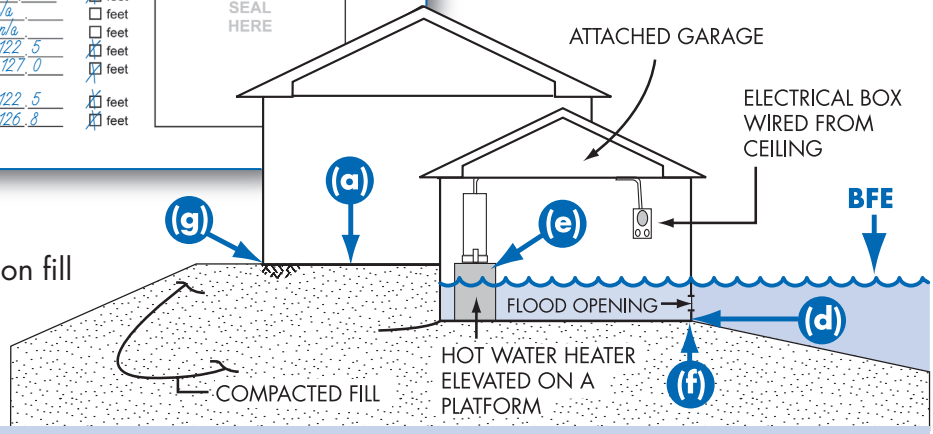
a)	Top of bottom floor (including basement, crawl space, or enclosure floor)	127.0	☒ feet
b)	Top of the next higher floor	n/a	☐ feet
c)	Bottom of the lowest horizontal structural member (V Zones only)	n/a	☐ feet
d)	Attached garage (top of slab)	122.5	☒ feet
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment in Comments)	127.0	☒ feet
f)	Lowest adjacent (finished) grade (LAG)	122.5	☒ feet
g)	Highest adjacent (finished) grade (HAG)	126.8	☒ feet

PLACE SEAL HERE

ELEVATION CERTIFICATE
(partial)

In this example, the BFE is 125.

The slab-on-grade house was elevated on fill 2 feet above the BFE, and the vented garage is 2.5 feet below the BFE.

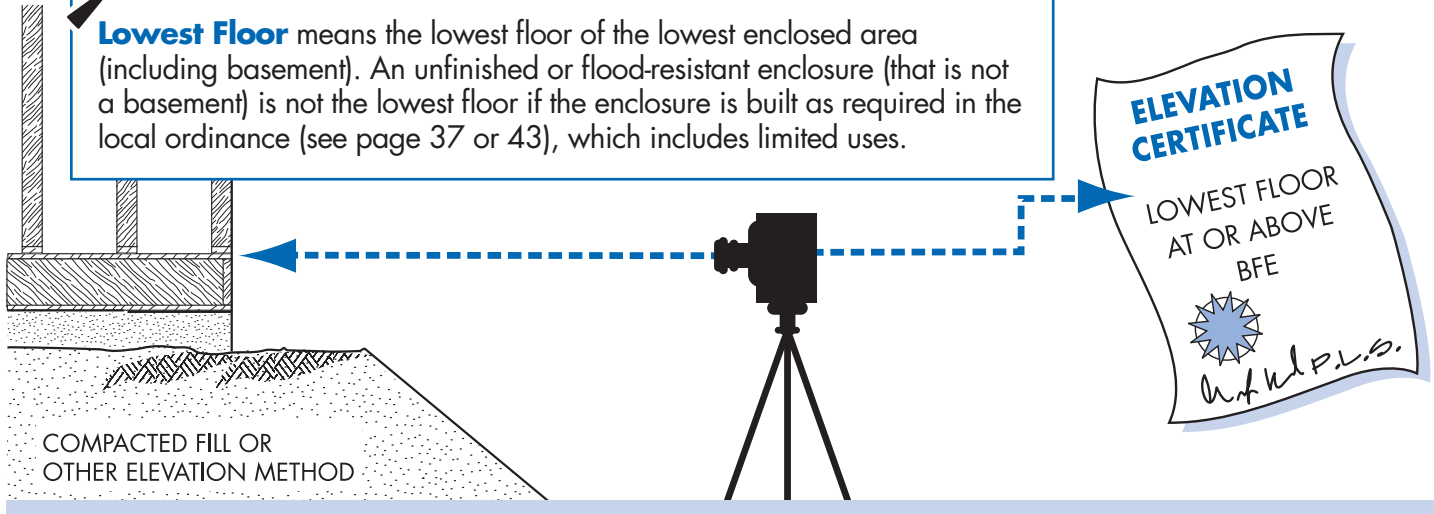


You will get a blank Elevation Certificate form when you get your permit. You **must** have a surveyor or engineer fill it out and seal it. The Elevation Certificate includes diagrams for eight building types. Several points must be surveyed.

Paperwork is Important – for You and Your Community

Terms and Definitions

Lowest Floor means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood-resistant enclosure (that is not a basement) is not the lowest floor if the enclosure is built as required in the local ordinance (see page 37 or 43), which includes limited uses.



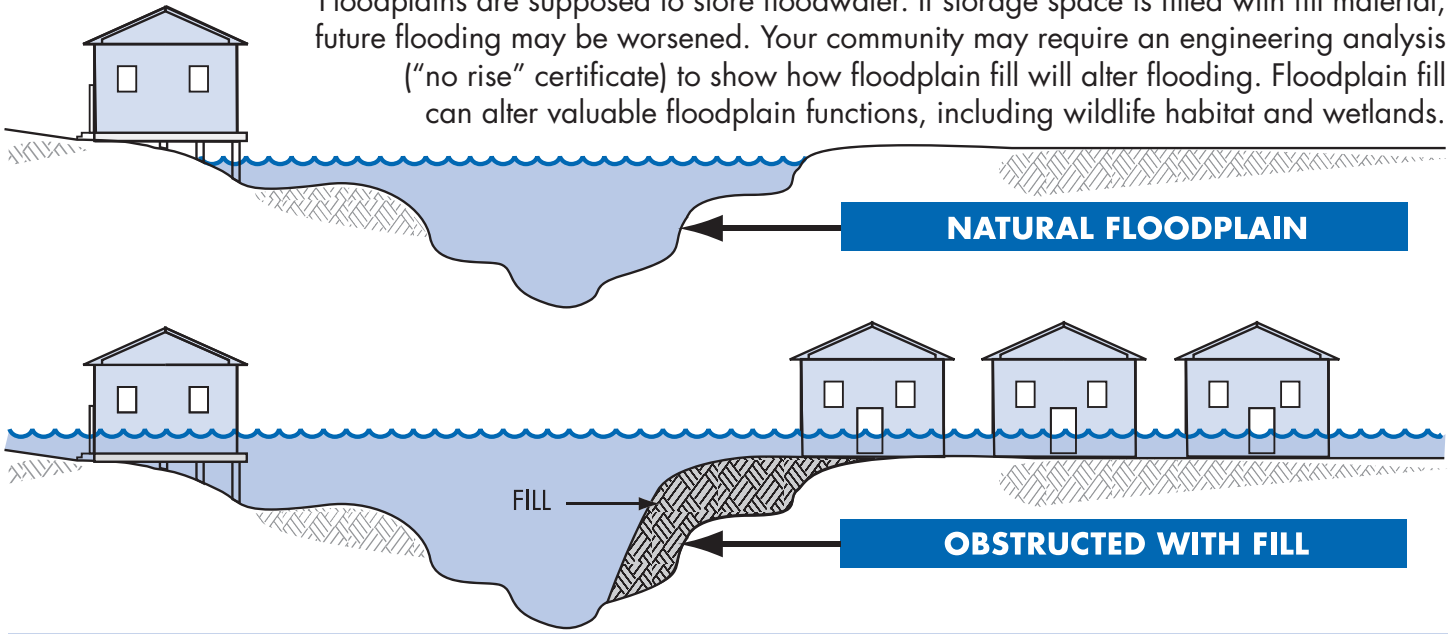
If you get a permit to build in the floodplain, you will be given an Elevation Certificate form. As soon as your lowest floor is set, get the form filled out and sealed by a surveyor or engineer.

This form is important!

It proves that you built correctly, and it can be used to obtain the correct insurance rating.

Floodplain Fill Can Make Things Worse

Floodplains are supposed to store floodwater. If storage space is filled with fill material, future flooding may be worsened. Your community may require an engineering analysis ("no rise" certificate) to show how floodplain fill will alter flooding. Floodplain fill can alter valuable floodplain functions, including wildlife habitat and wetlands.



Make sure your floodplain fill project will not harm your neighbors. Floodway fill is allowed **only** if an engineering evaluation demonstrates that "no rise" or "no impact" in flood level will occur (see page 34).

Required Floodway "No Rise" Certification

- Floodways can be dangerous because water may flow very fast.
- Development is not allowed unless "no rise" ("no impact") in flood elevations, floodway elevations, and floodway widths is certified.
- An engineer must evaluate the hydraulic impact of proposed development.

ENGINEERING "NO RISE" CERTIFICATION (example)

This is to certify that I am a duly qualified engineer licensed to practice in the State of Rhode Island. It is to further certify that the attached technical data supports the fact that the proposed (Name of Development) will not impact the Base Flood Elevations (100-year flood), floodway elevations, and the floodway widths on (Name of Stream).

BE FLOOD ALERT

NATIONAL FLOOD INSURANCE PROGRAM

Signature _____ Seal _____

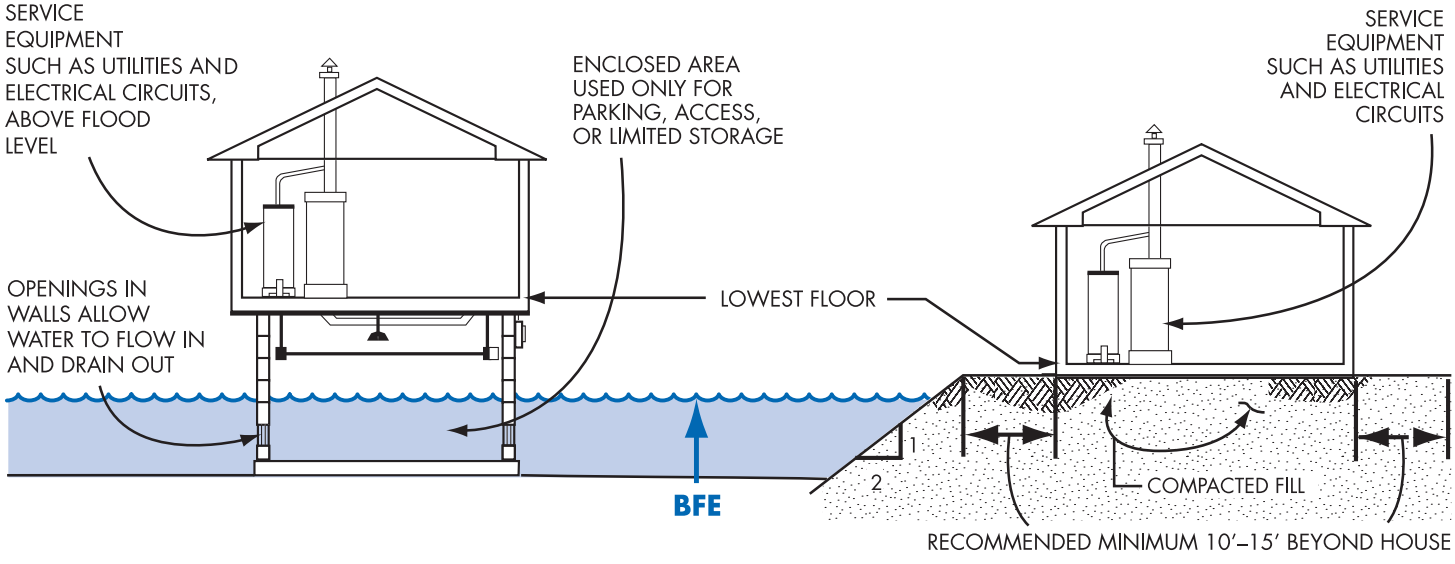
- A "no rise" or "no impact" certification is required and must be signed, sealed, and dated by a registered professional engineer.
- Check with your community for guidance before you decide to work in a floodway.

The engineering analysis must be based on technical data approved by FEMA.
Save time and money – do not build in the floodway!

How to Elevate Your Floodplain Building (Riverine)

ELEVATE ON FOUNDATION WALLS

ELEVATE ON FILL

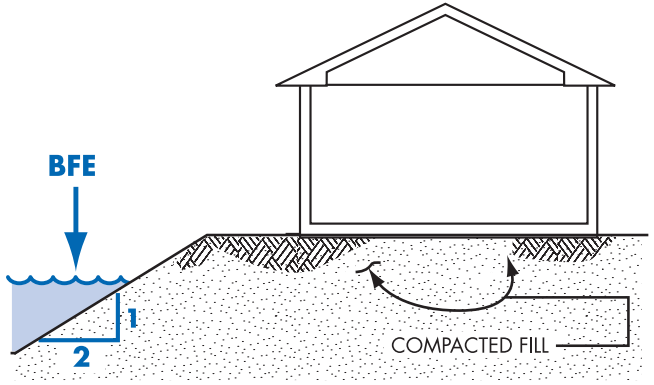


CAUTION! Enclosures (including crawlspaces) have some special requirements (see pages 37 and 38). Note: When the walking surface of the lowest floor is at the minimum elevation, under-floor utilities and duct work are not allowed. Fill used to elevate buildings must be placed properly (see page 36).

Compaction of Floodplain Fill

Earthen fill used to raise the ground above the flood elevation must be placed properly so that it does not erode or slump when water rises. For safety and to meet floodplain requirements, floodplain fill should:

- Be good clean soil, free of large rocks, construction debris, and woody material (stumps, roots).
- Be machine-compacted to 95 percent of the maximum density (determined by a design professional).
- Have graded side slopes that are not steeper than 2:1 (one foot vertical rise for every 2 feet horizontal extent); flatter slopes are recommended.
- Have slopes protected against erosion (vegetation for "low" velocities, durable materials for "high" velocities – determined by a design professional).



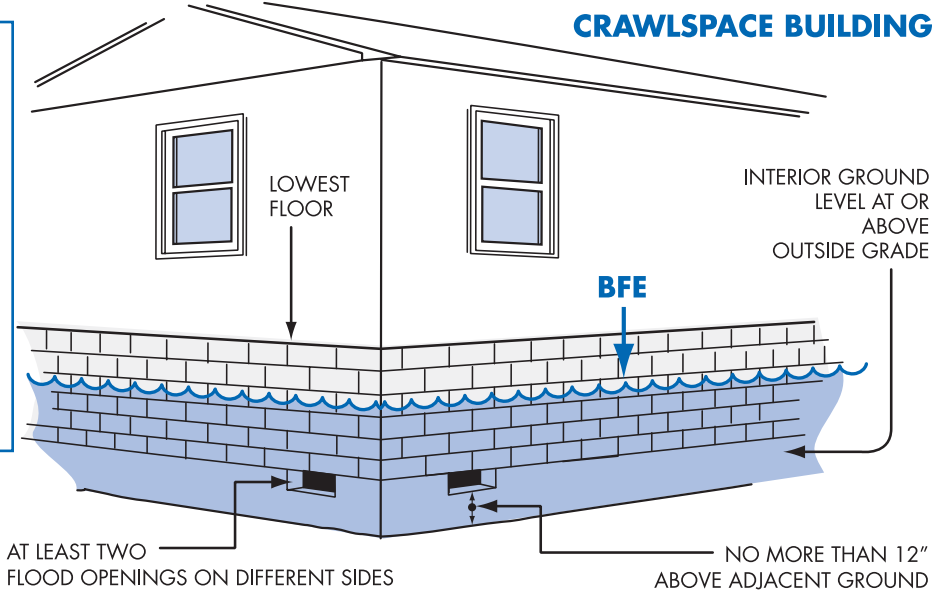
Your community may ask for certification of the elevation, compaction, slope, and slope protection materials. Your engineer or design professional can find more information in FEMA's technical guidance (MT-1).

Enclosures Below the BFE

NOTE:

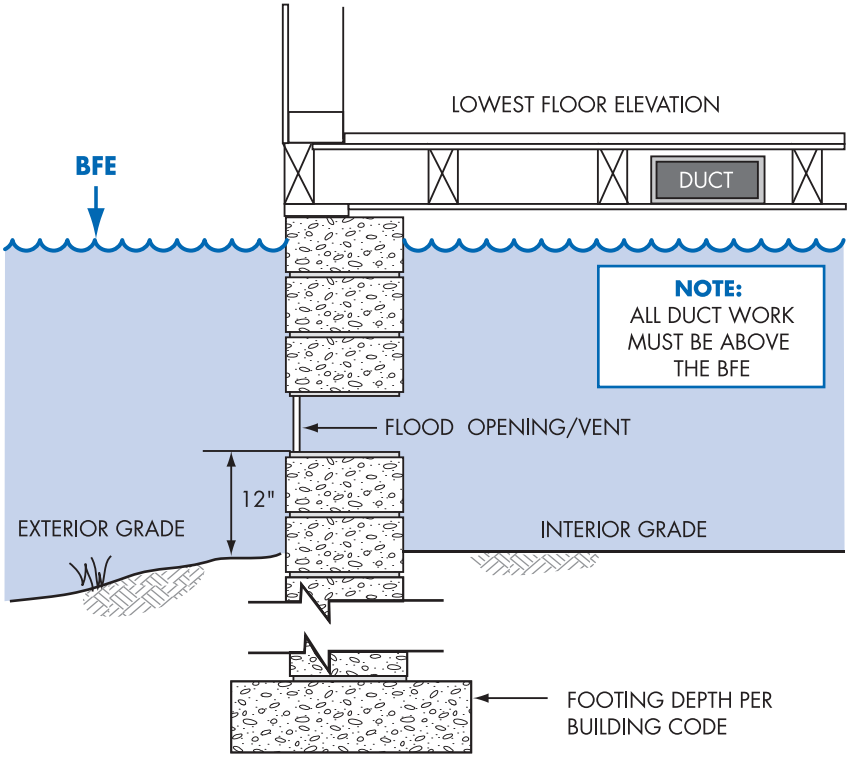
- Total net area of all total openings is 1 sq. in. per sq. ft. of enclosed area
- A 25′ x 45′ building needs 1,125 sq. inches of openings
- Standard air ventilation units must be disabled in the open position to allow water to flow in and out
- A typical standard air ventilation unit, with screen, provides 42 to 65 sq. inches of opening

ALTERNATIVE: Engineered openings are acceptable if certified to allow adequate automatic inflow and outflow of floodwaters.



Solid perimeter wall foundations can enclose flood-prone space. A crawlspace is a good way to elevate just a couple of feet. In all cases, the following are required: vents/openings, elevated utilities, flood-resistant materials, and limitations on use.

Crawlspace Details

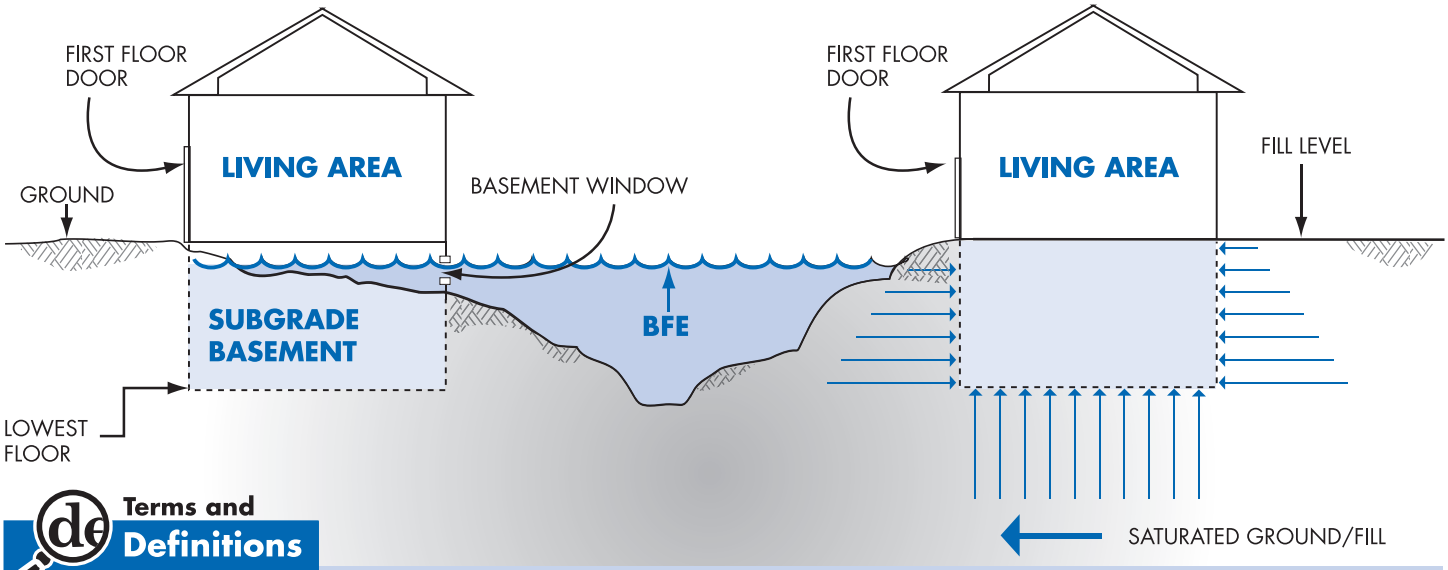


- The Lowest Floor Elevation must be at or above the BFE.
- The bottom of flood openings/vents must be no more than 12 inches above grade.
- Standard ventilation units must be disabled in the "open" position to allow water to flow in and out.
- Interior grade must be equal to or higher than exterior grade on at least one side.

Calculate Net Flood Opening:

A building that measures 25' x 45' has 1,125 square feet of enclosed crawlspace. Flood vents must provide 1,125 sq. in. of net open area (or have certified engineered openings). If a standard air vent unit provides 60 sq. in. of net open area, then to satisfy the flood opening requirement 19 vent units are required (1,125 divided by 60).

Basements Are Unsafe

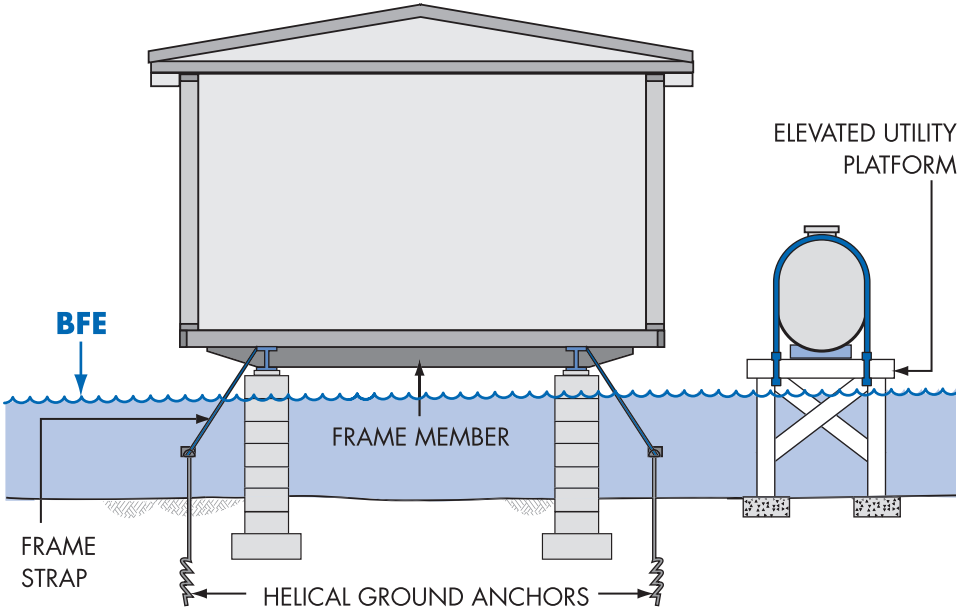


Terms and Definitions

A **basement** is any portion of a building that has its floor sub-grade (below ground level) on all sides.

Basements below the BFE **are not** allowed in new development and flood insurance coverage is very limited in existing basements for a very good reason. It only takes an inch of water over the sill and the entire basement fills up! Excavating a basement into fill does not always make it safe because saturated groundwater can damage the walls.

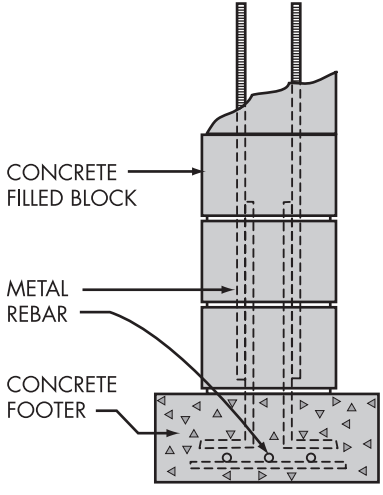
Manufactured Homes Require Special Attention



Manufactured homes must be anchored to resist flotation, collapse, or lateral movement by being tied down in accordance with your community's ordinance or the manufacturers' installation specifications.

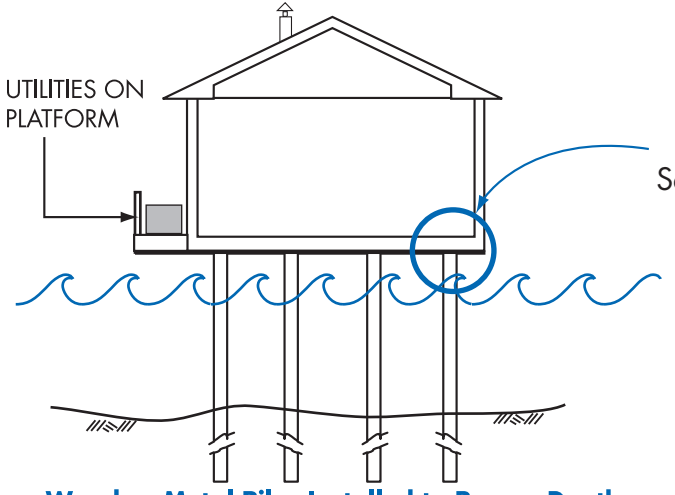
Experience shows that manufactured homes are easily damaged. As little as 1 foot of water can cause substantial damage.

Dry stacked blocks are not acceptable — they will **NOT** withstand a flood.



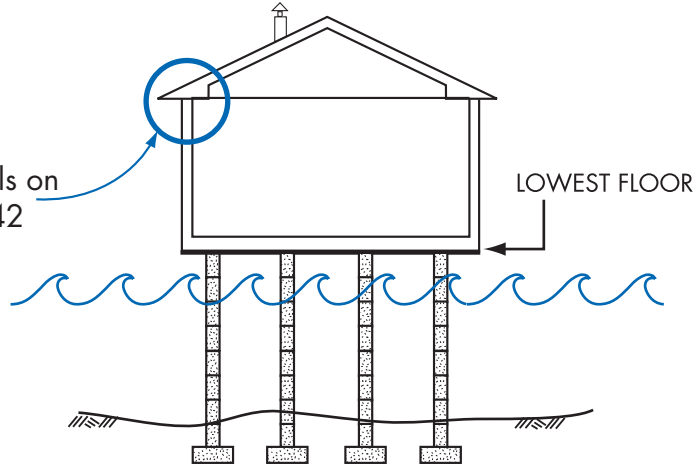
Typical Elevation Methods for Coastal Buildings

Elevate on Pilings



Wood or Metal Piles Installed to Proper Depth

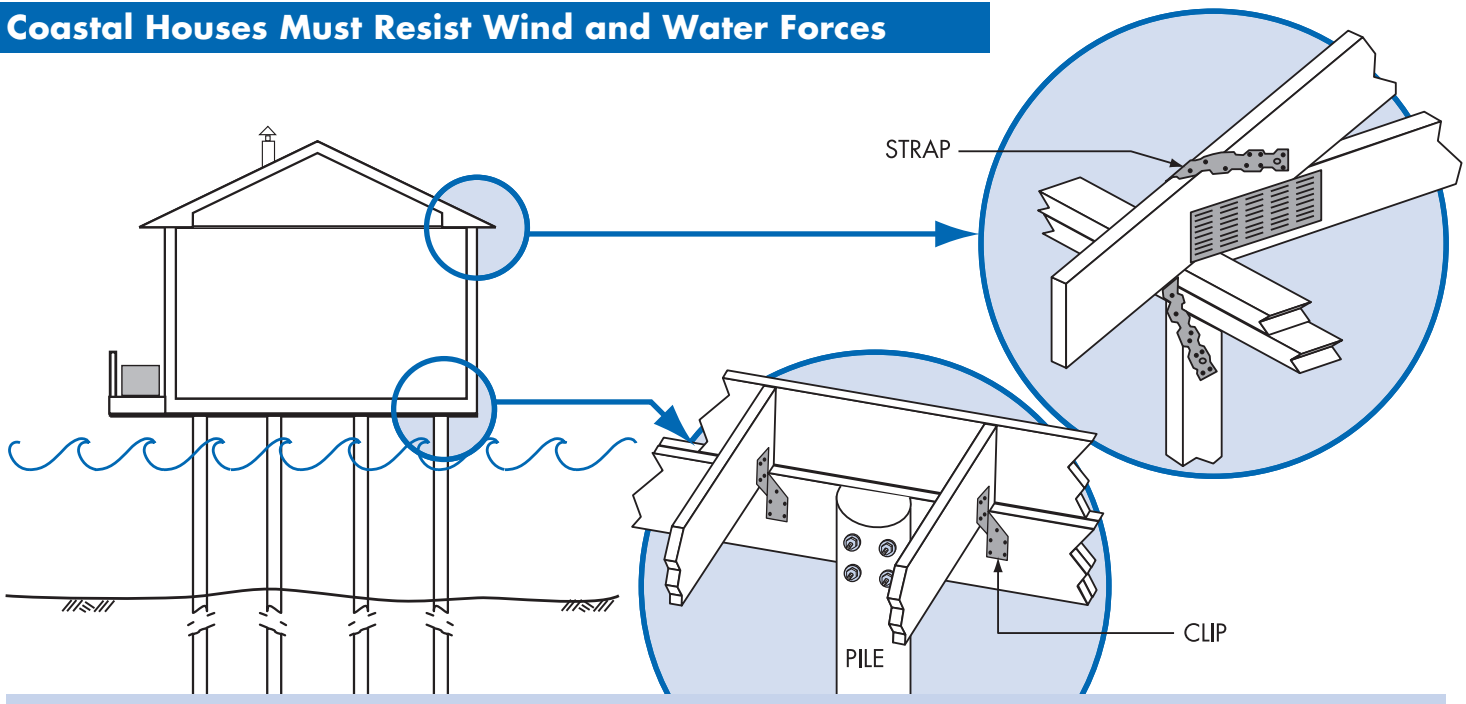
Elevate on Columns



Reinforced Masonry or Concrete Columns on Spread Footers

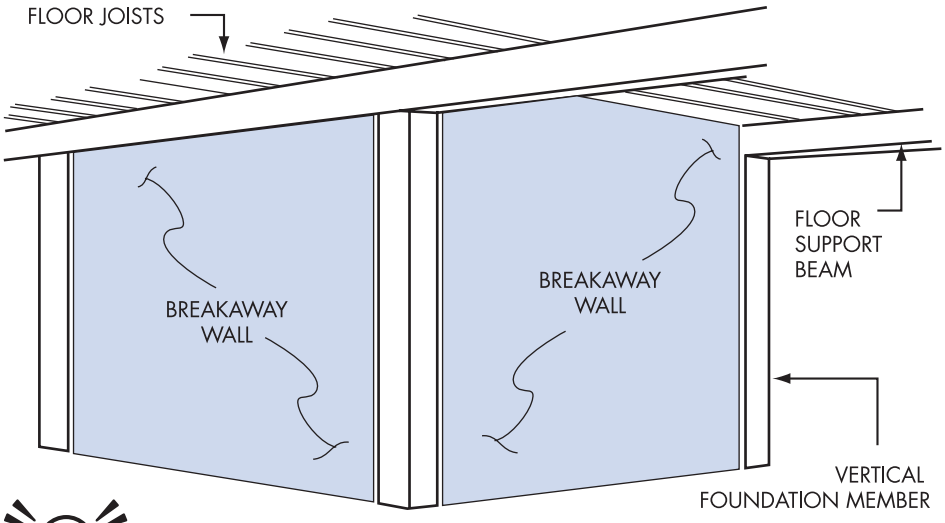
In V Zones the design specifics will be determined by your architect or engineer based on your site, including how your building will be elevated and how deep in the ground the foundation elements will extend. Your community will require certified or sealed building designs and plans (see page 44).

Coastal Houses Must Resist Wind and Water Forces



Coastal buildings may be exposed to both high winds and floodwater, so they must be built to hold together during storms. These details are only examples. Your architect or engineer will decide the type of clips and straps to keep the roof and building connected to the foundation.

Enclosures Below V Zone Buildings



Important

Information

Do not modify an enclosure below an elevated V Zone building (or any zone for that matter)! It is a violation of your community's regulations, and you may have increased damage when it floods. Plus, your flood insurance policy will cost a lot more!

Avoid building an enclosure under your V Zone building. If you must enclose a small area, your community will require:

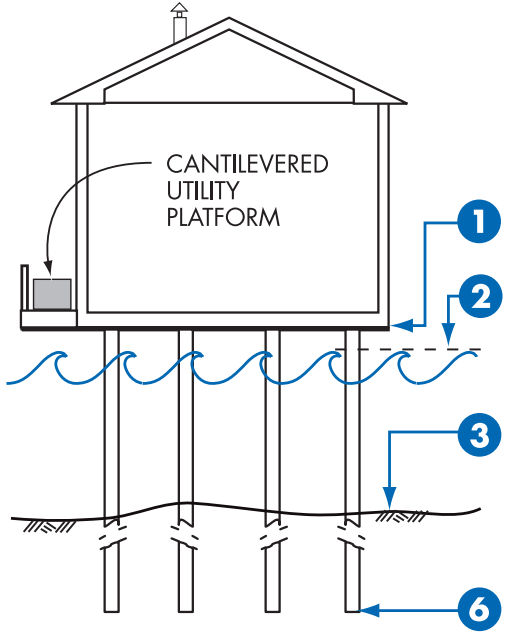
- Walls must be designed to collapse or "breakaway" under storm and flood conditions
- Must be unfinished and use flood resistant materials
- Utility wires and pipes should not go through or be attached to the breakaway walls
- Enclosed area is to be used only for parking, building access, or limited storage
- No bathrooms, utility rooms, or electric service below BFE
- Size limited to less than 300 square feet (or insurance premiums are higher)

The V Zone Certification (Sample)

V Zone Building and Performance Certification (partial)

Elevation Information

1. Elevation of the Bottom of the Lowest Horizontal Structural Member..... 17 feet
2. Base Flood Elevation (BFE)..... 16 feet
3. Elevation of Lowest Adjacent Grade (LAG)..... 6 feet
4. Foundation type: Piling X / Post __/ Pier __/ Column __/ Fill __/ Shear Wall __/ Enclosed Wall __/
   Foundation Description: DRIVEN WOOD PILES, NO OBSTRUCTIONS EXCEPT OPEN STAIRS
5. Approximate depth of scour/erosion used for foundation design..... 3 feet
6. Embedment depth of pilings or foundation below LAG..... 16 feet

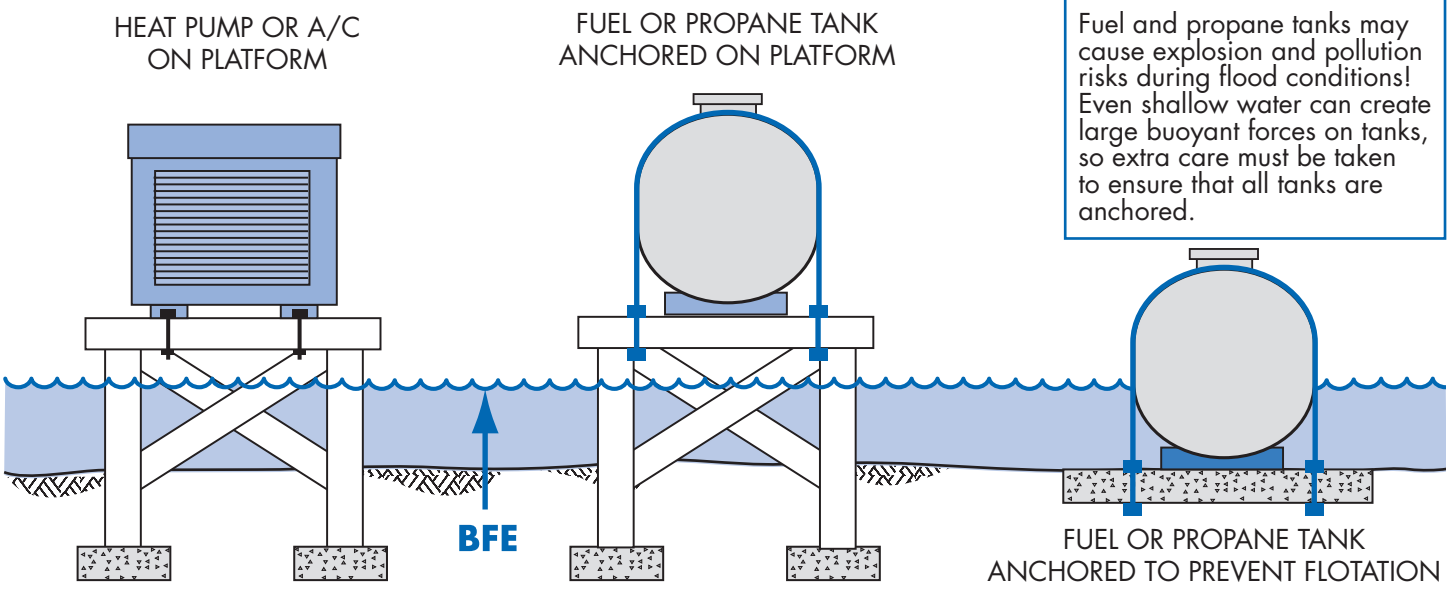


A Registered Professional Engineer or Architect must review or prepare your building design and provide a signed and sealed statement that the design meets minimum design and construction requirements.

Note: You will also have to submit an "as-built" Elevation Certificate when construction is finished.

Resource: *Coastal Construction Manual* (FEMA 55CD). Revised in 2000, this interactive CD is a useful tool for engineers and architects who design buildings in V zones.

Utility Service Outside Buildings

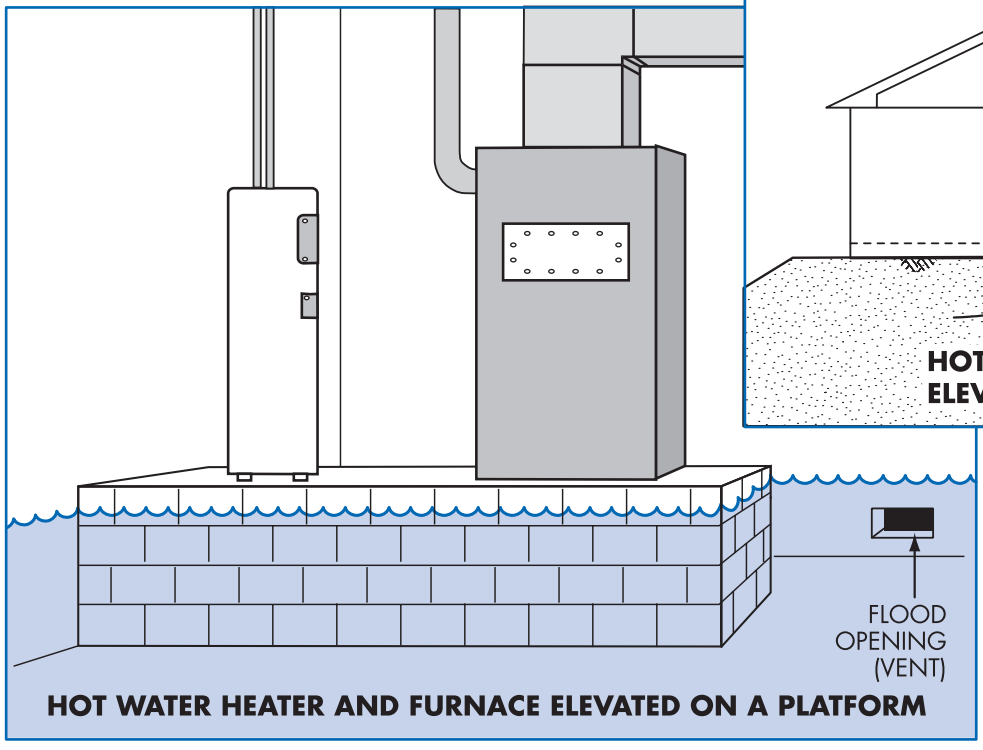


Important Information

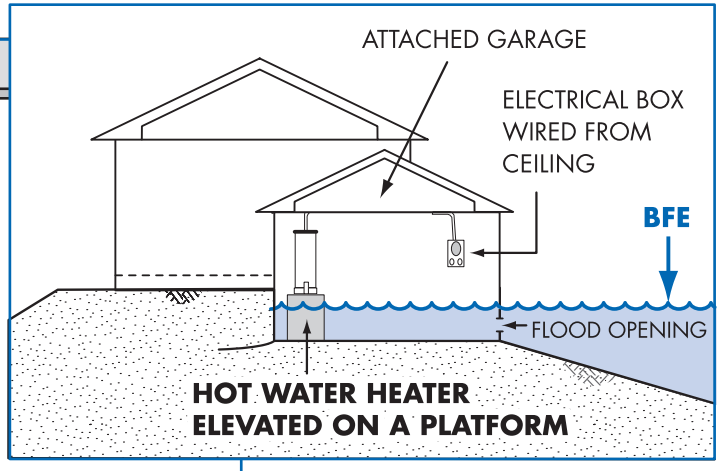
Fuel and propane tanks may cause explosion and pollution risks during flood conditions! Even shallow water can create large buoyant forces on tanks, so extra care must be taken to ensure that all tanks are anchored.

Whether inside an attached garage or outside the building, all utilities, appliances and equipment must be elevated above the BFE or protected against flood damage. Utilities include plumbing, electrical components, gas lines, fuel tanks, and heating and air conditioning equipment.

Utility Service Inside Enclosures



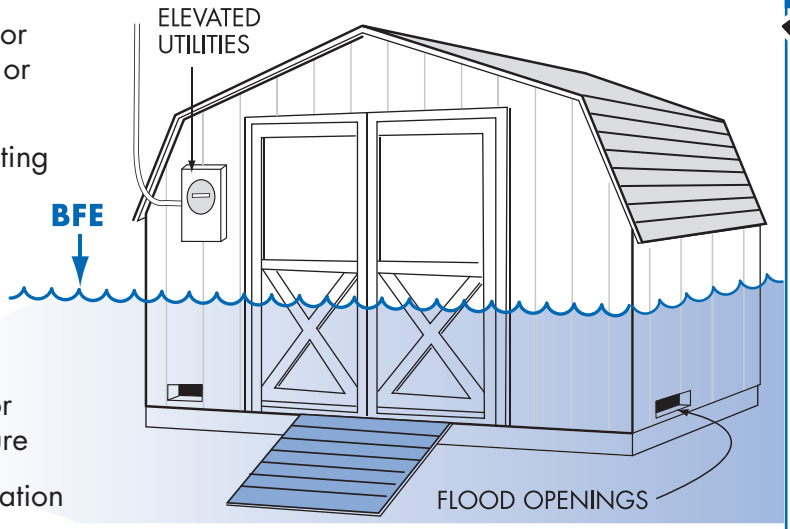
HOT WATER HEATER AND FURNACE ELEVATED ON A PLATFORM



All utilities, appliances, and equipment must be elevated above the BFE or protected. Utilities include plumbing, electrical components, gas lines, and heating and air conditioning equipment.

Accessory (Appurtenant) Structures

- Not habitable
- Used only for parking or storage (not pollutants or hazardous materials)
- Anchored to resist floating
- Flood openings/vents
- Built of flood-resistant materials
- Elevated utilities
- Cannot be modified for different use in the future
- Documented floor elevation



Even small buildings are "development" and permits or variances with noted conditions are required. They must be elevated or anchored and built to withstand flood damage.
Caution! Remember, everything inside is likely to get wet when flooding occurs.

Terms and Definitions

Accessory (Appurtenant) Structure means a structure that is located on the same parcel of land as a principal structure and its use is incidental to the use of the principal structure. Accessory structures may not be used for human habitation and must be designed to minimize flood damage. Examples: detached garages, carports, storage sheds, pole barns, and hay sheds.

Recreational Vehicles

In a flood hazard area, an RV must:

- Be licensed and titled as an RV or park model (not as a permanent residence)
- Be built on a single chassis
- Have inflated wheels and be self-propelled or towable by light truck
- Have no attached deck, porch, or shed
- Be used for temporary recreational, camping, travel, or seasonal use (no more than 180 days)
- Have quick-disconnect sewage, water, and electrical connectors

Important Information

Camping near the water?
Ask the campground or RV park operator about flood warnings and plans for safe evacuations.

RVs that do not meet these conditions must be installed and elevated like Manufactured Homes, including permanent foundations and tie-downs (see page 40).

Planning to Improve Your Floodplain Building?

To obtain a permit to improve an existing building:

- You must provide a copy of your construction contract or a cost estimate (including estimated market value of your own or donated labor and materials).
- Your community will compare the cost of the proposed work to the market value of your building and check the value of improvements.
- You may submit an independent assessment of the market value of the building, if performed by a licensed appraiser.
- If the cost of the improvement (or if the proposed work plus improvements) equals or exceeds 50% of the market value of the building, you must comply with the Substantial Improvement requirements.
- If the costs do not trigger Substantial Improvement requirements, then you should still consider ways to reduce future damage (see page 50).

Terms and Definitions

Substantial Improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. This term includes structures which have incurred substantial damage by any cause, regardless of the actual repair work performed (see page 54).

Important Information

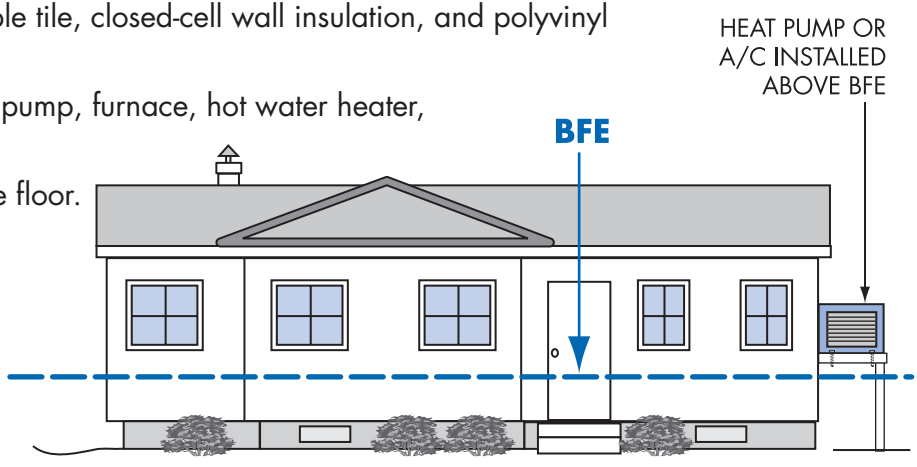
Improvements include:

- Renovation/ rehabilitation of the interior of the existing building (see page 51)
- Lateral addition, without renovation or structural alteration of the existing building (see page 52)
- Lateral addition, with renovation or structural alteration of the existing building (see page 53)
- Vertical addition (add new story).

Non-Substantial Improvements

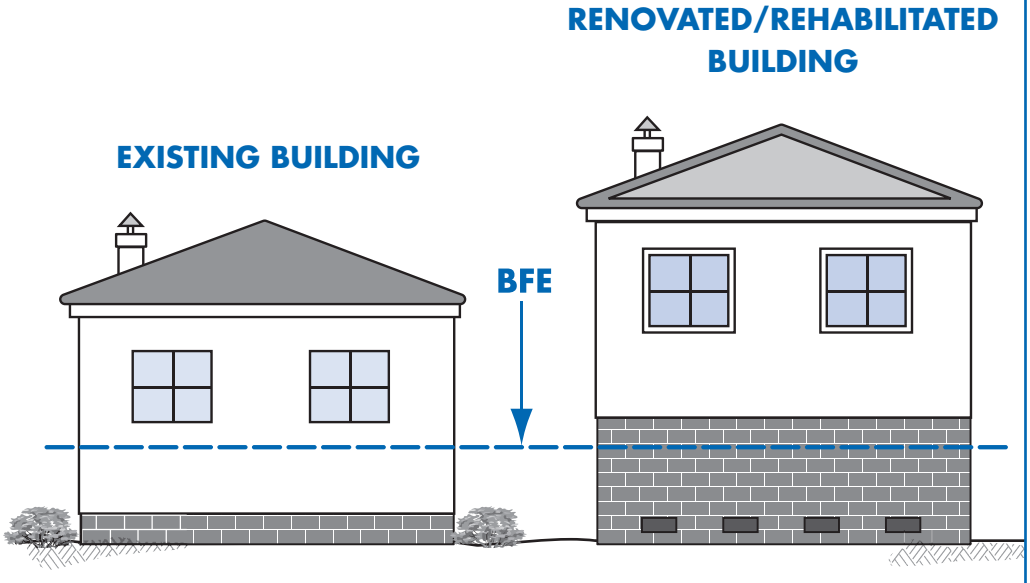
Your proposed improvements are "non-substantial" if the costs of all improvements are less than 50% of the market value of the building. Although you are not required to bring the existing building into compliance, there are many things you can do to reduce future flood damage. Find out the BFE at your location and consider the following:

- Use flood resistant materials, for example tile, closed-cell wall insulation, and polyvinyl wall coverings.
- Raise air conditioning equipment, heat pump, furnace, hot water heater, and other appliances on platforms.
- Install electrical outlets higher above the floor.
- Move ductwork out of crawlspaces.
- Retrofit crawlspaces with flood openings.
- Fill in below-grade crawlspaces/ utility space.



Note! Be sure to include ALL proposed work in your initial permit application. If you add more work after the permit is issued, your community will make another evaluation for Substantial Improvement.

Substantial Improvement: Renovation Only



Important Information

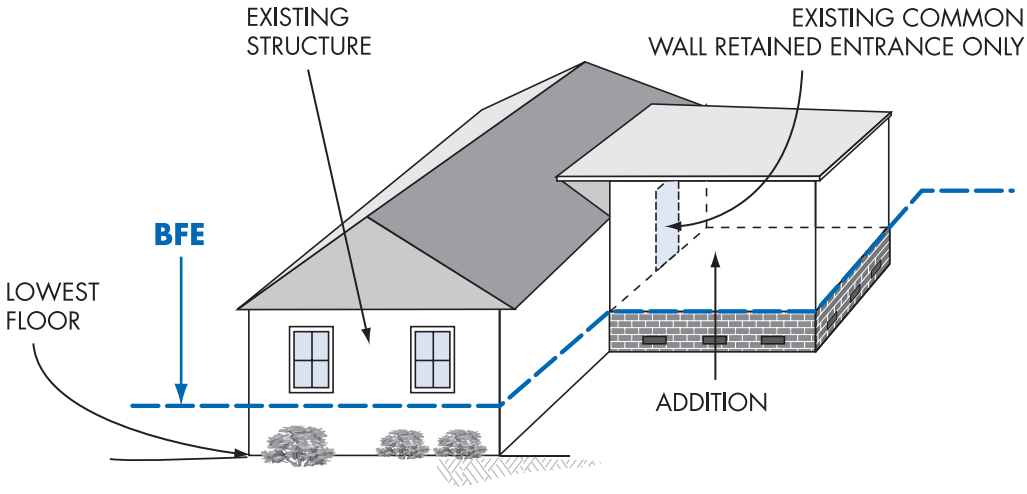
Floodplain buildings can be improved, renovated, rehabilitated or altered, but special rules apply.

Check with your local permit office before you begin. It will be easier to do it right the first time.

The cost to correct previously cited violations of state or local health, sanitary, or safety codes to provide safe living conditions can be excluded from the cost of renovations.

Alteration of a registered historic structure is allowed, as long as it will continue to meet the criteria for listing as a historic structure.

Substantial Improvement: Lateral Addition Only



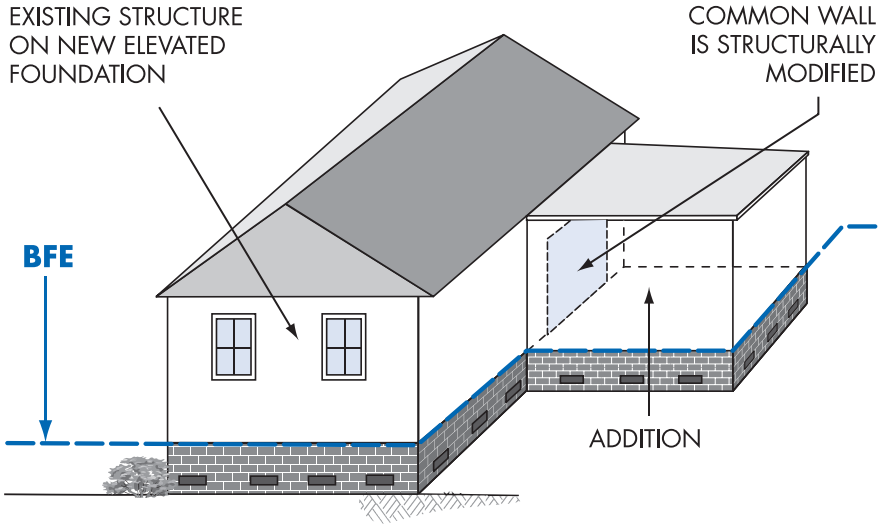
Important Information

See page 53 if your project to add a lateral addition also includes modifying the interior of the existing building or making structural modifications to the existing common wall.

You must get a permit from your community to build an addition to your floodplain building. If the existing building is not already properly elevated, then only the addition must be built with the lowest floor at or above the Base Flood Elevation provided:

- You make no interior modifications to the existing building; and
- You make no structural modifications to the existing common wall other than adding a connecting doorway.

Substantial Improvement: Addition Plus Other Work



Your community must prepare an evaluation to determine if all of your proposed work will trigger the Substantial Improvement requirement. Substantial Improvement is triggered if:

- The work involves adding a new top floor, modifying the interior of the existing building, or structural modifications to the existing common wall (for lateral addition); and
- The cost of all proposed work plus the cost of improvements equals or exceeds 50% of the market value of the existing building.

Your community's permit office can help you determine which requirements apply. It is always a good idea to request a preliminary review before you get too far along with your plans.

What About After Damages?

PRE-DAMAGE BUIDLING
MARKET VALUE=$100,000

REPAIR TO PRE-DAMAGE
CONDITION = 60%

PERMIT/ELEVATION
REQUIRED

A permit is required to repair substantial damage from any cause — fire, flood, wind, or even a truck running into a building. Check with your community permit office to be sure.
You will be asked to provide a detailed cost estimate for repairs.
See page 56 for more information about elevating an existing building above a crawlspace.

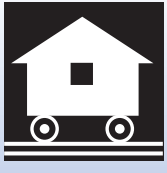
Paying for Post-Flood Compliance

You may be eligible for up to $30,000 to help pay to protect your building from future flood damage – to bring it into compliance with your community's floodplain requirements – if:

USE THE ICC CLAIM TO:

ELEVATE THE HOUSE ON YOUR LOT

DEMOLISH AND REBUILD THE HOUSE

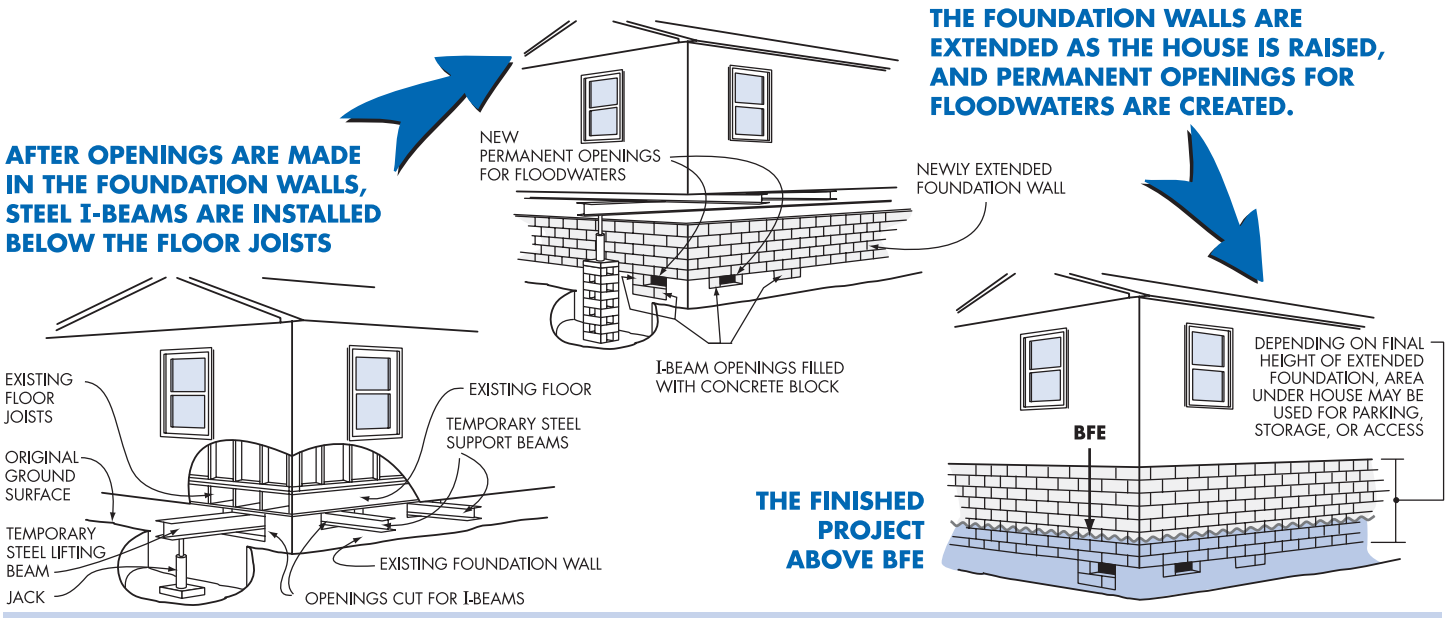


MOVE THE HOUSE TO HIGH GROUND

- You have NFIP flood insurance – it includes Increased Cost of Compliance (ICC).
- Your building is in the mapped Special Flood Hazard Area.
- Your community has made an official determination that the building was substantially damaged by flooding.
- You act quickly to process all the required paperwork.

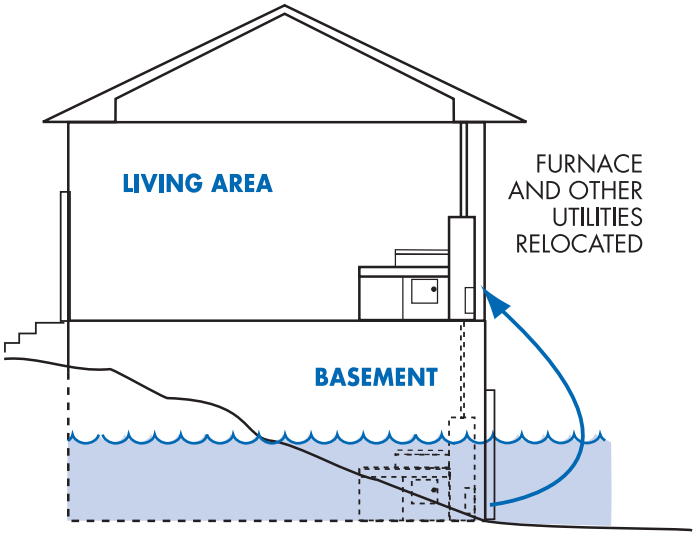
Owners whose buildings are substantially damaged are required to "bring the building into compliance" with floodplain requirements. Substantial damage is a special case of substantial improvement.

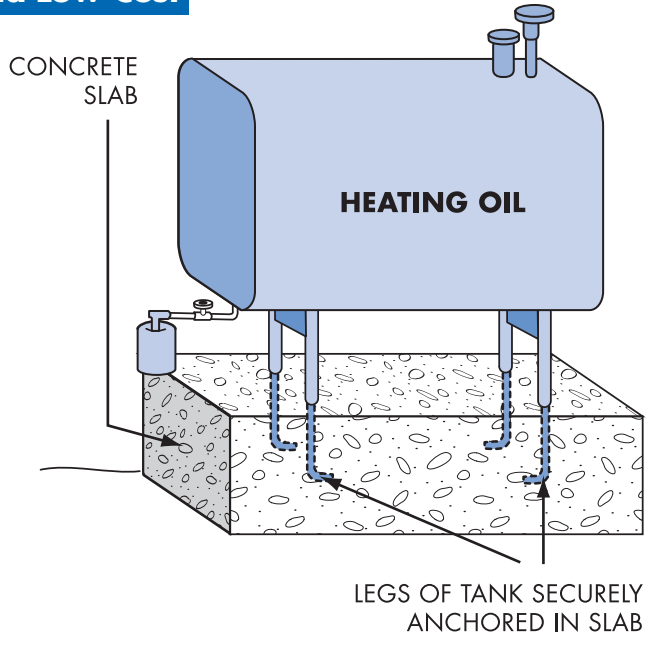
Elevating a Pre-FIRM Building



This is one way to elevate an existing building to comply with floodplain regulations. If your insured building is damaged by flood and your community determines it is substantially damaged, you may be eligible for an **Increased Cost of Compliance** payment (see page 55). The state and FEMA can help with more information and options.

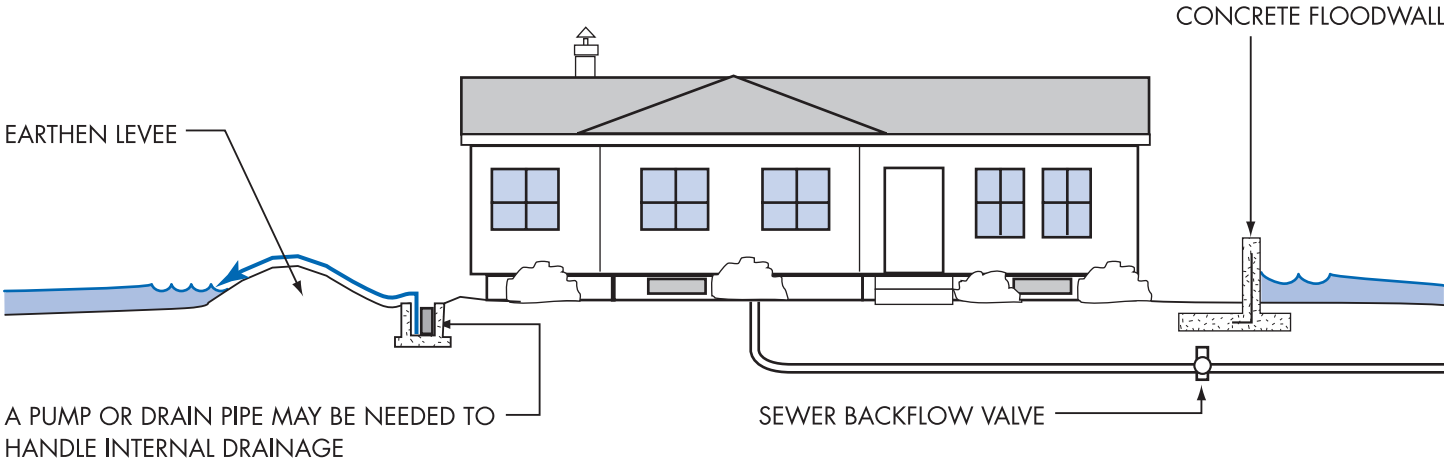
Some Flood Protection for Older Homes is Easy and Low Cost





Move water heaters, furnaces, and duct work out of basements and crawlspaces. Anchor heating oil and propane gas tanks to prevent flotation. **Do not** store valuables or hazardous materials in a flood-prone crawlspace or basement. Use water-resistant materials when you repair.

Small Levees and Floodwalls Can Protect Some Older Homes

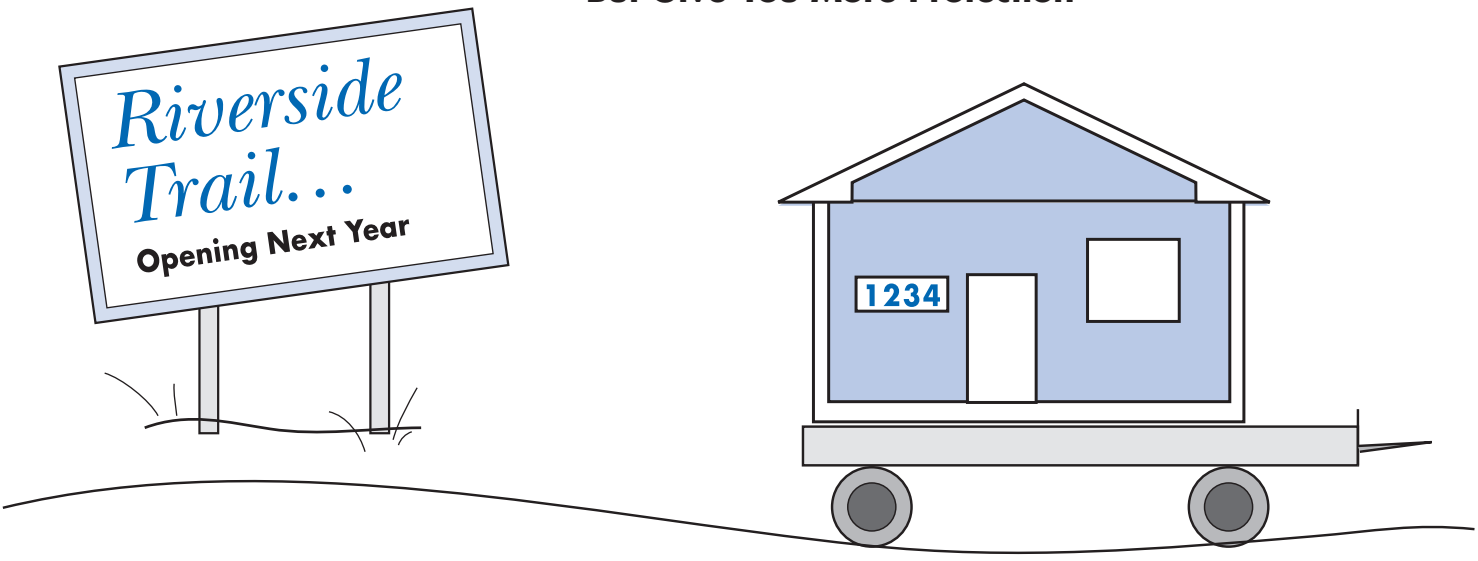


In areas where floodwaters are not expected to be deep, sometimes individual buildings can be protected by earthen levees or concrete floodwalls. You must get a permit for those protection measures, and extra care must be taken if the site is in a Floodway. A small levee or floodwall cannot be use to achieve compliance for a new or substantially improved building, or one that is repaired after substantial damage.

Important! These protective measures will not reduce your flood insurance premium!

Some Flood Mitigation Projects are More Costly

But Give You More Protection



After floods, some communities buy out and demolish homes that were severely damaged. The acquired land is dedicated to open space and can be used for recreation or to help restore wildlife habitat and wetlands. Homes have been raised up on higher foundations, and others have been moved to safer high ground.

Be Prepared for Flood Emergencies

Everyone should be prepared for floods and other emergencies. You need to be prepared at home, at work, at school, and in your community.

Sometimes floods and other disasters can strike quickly and without warning. You may have to evacuate your neighborhood, workplace or school, or you may be trapped at home. Ask yourself – what would I do if basic services (water, gas, electricity and telephones) are interrupted, perhaps for several days? Local officials and emergency relief workers will be on the scene after disasters, but they cannot reach everyone right away. You need to be prepared to keep your family safer by preparing now:

- Learn about the risks in your community
- Make a family or workplace emergency plan
- Know where to go if you are told to evacuate
- Put together a disaster kit with supplies to last a couple of days

To learn more about preparing for disasters, visit the American Red Cross at http://www.redcross.org and click on "Get Prepared."

Turn Around Don't Drown™

Follow these safety rules:

- When flooding is expected, stay away from creeks, streams, and rivers.
- NEVER drive through flooded roads – they may be washed out.
- Passenger cars may float in only 18-24 inches of water.
- Be especially cautious at night when it is harder to recognize dangers.
- Just 6 inches of fast-moving water can knock you off your feet.
- **http://www.weather.gov/os/water/tadd/**.

Useful Resources and Common Acronyms

Useful Resources

- RI Flood Mitigation Association: **http://ri.floods.org**
- American Red Cross: **http://www.redcross.org** (click on Disaster Services).
- CRS Resource Center: **http://www.training.fema.gov/EMIWeb/CRS**
- FEMA has developed materials to help families and businesses prepare for floods and recover from disasters: **http://www.fema.gov/library**
- RI Emergency Management Agency: **http://www.riema.ri.gov**
- RI Coastal Resources Management Council: **http://www.crmc.ri.gov**
- RI Division of Planning: **http://www.planning.ri.gov**
- RI Department of Insurance: **http://www.dbr.ri.gov/divisions/insurance**
- RI State Building Commission: (401) 222-3529

Common Acronyms

- BFE = Base Flood Elevation
- EC = Elevation Certificate
- FEMA = Federal Emergency Management Agency
- FIRM = Flood Insurance Rate Map
- ICC = Increased Cost of Compliance
- NFIP = National Flood Insurance Program
- RIEMA = Rhode Island Emergency Management Agency
- SFHA = Special Flood Hazard Area (100-year floodplain)

Want to Learn More?

- For advice on flood information and permits, call your community's building permit office, engineering, or planning department.
- To order flood maps, call FEMA's Map Service Center – (800) 358-9616 or enter the FEMA Map Store to order online at **http://msc.fema.gov**.
- Consumer information about flood insurance, flood risks, and flood maps is online at **http://www.floodsmart.gov**. Click on "Related Links" then "Flood Hazard Maps" to learn more about maps and map modernization.
- FEMA's online publications can be found at **http://www.fema.gov/library**. Search by key word, title, or publication number. Order free printed copies at (800) 480-2520.
- Call your insurance agent to buy a policy. Most insurance companies can write an NFIP policy for you. If you need more help, call the National Flood Insurance Program's toll free number to get the name of an agent in your area who does write flood insurance, (888) 356-6329.
- To get the best rates for flood insurance, call a local surveyor to complete an Elevation Certificate.
- Find online Elevation Certificate training for surveyors by going to **http://www.fema.gov** and search on "Elevation Certificate."
- To find out how many NFIP flood insurance policies are in force in your community, or how many claims have been paid since 1978, go to **http://www.fema.gov/business/nfip/** and click on "Flood Insurance Statistics."